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ABSTRACT

Highlighting the issues that confront small libraries who are exploring automation options, this report focuses on microcomputer-based automation systems for circulation and an online patron access catalog (OPAC). The information provided outlines some of the questions that librarians must ask themselves or vendors before they select a specific automated circulation system or online catalog. Section 1 provides general background information on the issues and problems confronting small libraries in their quest for an acceptable automation system, lists some common automation questions that librarians often have, offers an outline of the planning process and its basic steps, and considers the role of retrospective conversion. Section 2 discusses issues associated with the automated system's ability to manage and maintain the cataloging database, provides information on automated circulation systems and online catalogs, lists possible features that may be needed in an automated system, identifies issues related to hardware and local area networks (LANs), and considers some of the issues that libraries confront when working with vendors of automated systems. Section 3 reviews the specific features and capabilities of seven automation systems: Columbia; Data Trek; Follett; Library Automation Products; Library Corporation; Media Flex; and Winnebago. The five appendixes included in Section Four contains information on the costs of automating; a brief requirements checklist; a list of vendors that have microcomputer-based automated systems; an explanation of how to extract MARC records for libraries participating in WISCAT; and an automation/computer glossary of terms. (MAB)

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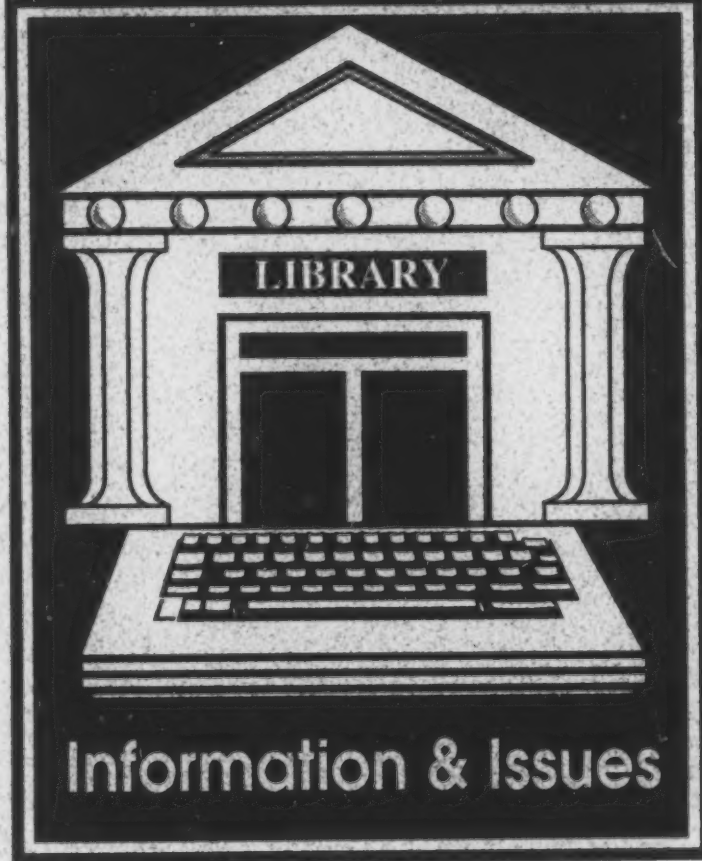
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Small Library Automation: Information and Issues



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Foreword

Libraries have traditionally been the repositories of information. Many large public and academic libraries have automated to make information more accessible and to make their operations more efficient. Traditionally, because of restraints imposed by technology and costs, many small libraries have not been able to benefit from automating basic library functions. With the development of powerful, yet inexpensive, microcomputers and appropriate software smaller libraries can also take advantage of automation. This publication is designed specifically to assist smaller libraries of all types to automate their operations and to allow staff and patrons to benefit from it. Through the use of this new technology libraries, regardless of their size, can be at the forefront of providing access to knowledge for the people they serve.

Herbert J. Grover
State Superintendent

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Introduction

Most of the literature on library automation focuses on larger libraries that are considering *minicomputer*-based automated systems. However, small libraries outnumber larger-sized libraries. Smaller libraries and school library media centers need information on the process used for investigating, evaluating, and selecting automated library systems that operate on *microcomputers*.

While there are many similarities in the process of automating a large or small library, there are also distinct differences. This publication highlights those differences and other issues that confront smaller libraries as they explore their automation options. The specific focus is on microcomputer-based automated systems for circulation and an online patron access catalog (OPAC). Automating these two basic library functions will be the most expensive and time-consuming automation-related activities that a library undertakes. The information provided also outlines some of the questions that librarians must ask themselves or vendors, before they select a specific automated circulation system or online catalog.

This publication is not a primer on the basics of microcomputer technology and operations. It is intended to be used by library staff who have a general knowledge of microcomputers and computer terminology. A glossary is provided in Appendix E for words or terms that may not be familiar to all readers.

Librarians often want straightforward "yes" or "no" answers to their automation questions. Unfortunately, many questions related to library automation cannot be definitively answered in such simple terms. Words and phrases such as "usually," "very few," or "almost always" do not compromise any given statement. They are necessary to make librarians aware that, regardless of how encompassing a statement sounds in the context of library automation, there are "almost always" exceptions. There are exceptions because different libraries may require different automated systems, even if the basic need is the same (the need to automate circulation). An automated system that is perfectly acceptable for one library will be totally unacceptable for another. Because there are few definitive answers, the process of investigating, evaluating, and selecting an automated system is often difficult regardless of a library's size.

The cautions issued throughout this publication should not be viewed as a deterrent to installing an automated system. Rather, they should be used as guidelines to avoid many of the problems and obstacles that librarians often encounter in the automation process. Moving forward with an automated system can seldom be done by strictly adhering to a narrow, straight line. The long-term benefits of installing an acceptable automated system far outweigh any short-term difficulties.

Section 1: Automation in a Small Library

Section I consists of four chapters. The first chapter provides general background information on the issues and problems confronting small libraries in their quest for an acceptable microcomputer-based automated circulation system and online catalog. Chapter Two lists some common questions librarians often have as they investigate their automation options. The third chapter offers an outline of the planning process and lists some of the basic steps that must be followed, or at least considered, as part of the automation process. Chapter Four covers the important aspect of catalog (retrospective) conversion and the vital role it plays in providing the foundation upon which any automated system is built.

Section 2: Microcomputer-based Automated Systems

These five chapters include information on the basic functions performed by microcomputer automated systems and related issues on hardware and vendors. Chapter Five discusses issues associated with the automated system's ability to manage and maintain the library's cataloging database. Chapters Six and Seven provide information on automated circulation systems and online catalogs, respectively. Also included is a list of possible features that may be needed in an automated system. Chapter Eight looks at the issues of hardware and local area networks. The final chapter in this section, chapter nine, considers some of the issues that libraries confront when working with vendors of automated systems.

Most of the specific features listed in the following chapters are in a question and answer format to help determine how important any specific feature is to a particular library. No library will need all of the features listed and some may be judged more important than others. A feature judged essential to one library may be totally superfluous to another. Staff are encouraged to prioritize any features they want using the hierarchy (E = Essential, H = Highly desirable, D = Desirable) found in chapter three.

Section 3: Reviews of Microcomputer-based Automated Systems

The automated systems reviewed in this section were part of an LSCA grant awarded to the Waukesha County Federated Library System. A vendor's representative demonstrated each system reviewed. Librarians asked each representative detailed questions during the presentations. Each vendor also received follow-up questions to assist in completing the reviews. While every attempt has been made to verify the accuracy of the information provided in these reviews, library staff should always contact vendors directly to get the latest information on their respective automated systems. Vendors are continually updating their systems. Specific features and capabilities that were not available with the versions of the circulation and online catalog programs used in the on-site presentations in Waukesha County may be available in a new program update.

Because of staff and budget constraints not all vendors of microcomputer-based circulation systems and online catalogs were able to participate in the on-site demonstrations. A list of the vendors that did participate, along with other vendors that also have microcomputer-based circulation systems and/or online catalogs, is provided in Appendix C.

Section 4: Appendixes

The following appendixes are designed to further assist librarians in obtaining the information necessary to make better, more informed, automation decisions. The five appendixes in the following section cover: costs of automating, a brief requirements checklist, a list of vendors that have microcomputer-based automated systems, an explanation on extracting MARC records for libraries participating in WISCAT, and an automation/computer glossary.

Automation in a "Small" Library

Chapter 1: The "Small" Library and Automated Systems

Chapter 2: Automation Questions Often Asked in Small Libraries

*Chapter 3: Planning and Evaluating Microcomputer-based
Automated Systems*

Chapter 4: Catalog Conversion and MARC Records

Chapter 1

The "Small" Library and Automated Systems

The definition of a "small" library varies with each librarian's perspective. This document defines a small library in the context of implementing an automated system. In brief, a small library is one that can implement an acceptable microcomputer-based circulation system and online catalog. While this is a concise definition, determining whether a library meets this definition can be difficult because of the many issues that must be considered.

There is a critical difference between implementing a micro-based automated system that technically works and installing a micro-based system that is acceptable. For example, a system that takes ten to twelve seconds to read the barcode of a book being charged out technically functions as an automated circulation system. However, few librarians would consider this an acceptable system.

Why should small libraries consider an automated system? The functions of circulating items and maintaining the card catalog are labor-intensive activities regardless of a library's size. Automating these two major operations in many small libraries can free valuable and limited staff time. Time that is currently spent on repetitive and laborious work, such as processing overdue notices and filing cards in the catalog, can be better spent on providing more direct assistance to the library's patrons. Automating circulation can make the entire circulation process faster and more efficient compared to any manual system. Implementing an online catalog can provide significantly better access to the library's collection than is possible with a traditional card catalog. Ultimately, improving services to the library's patrons should be a major goal of any automation effort. The size of the library should seldom be a factor in establishing this goal.

What Is an "Automated Library System"?

Any "automated system" consists of a combination of software, hardware, and databases that are designed to work together to accomplish a specific task. Remove any one of these three key components and the system will not function. Using this definition, an automated library system can be more precisely defined as: software written to automate the library's circulation procedures and provide for an online catalog which operates on compatible computer hardware, and uses databases which consist, at a minimum, of patron data, circulation data, and cataloging data.

Larger libraries have been using computers for several decades to assist them with various library functions, but there was not a viable commercial market for automated circulation systems until the mid-1970s. The circulation systems initially developed and marketed by vendors operated on minicomputers. Minicomputers, originally developed in the 1960s, are usually floor-standing units housed in a separate room with special HVAC (heating, ventilating, air conditioning) controls and power supply. Library personnel that operate them need to be familiar with data processing procedures. Minicomputers continue to be the hardware used by most larger libraries that implement automated systems. Unfortunately, the minicomputer-based systems are affordable only for large libraries or a consortium of libraries sharing a system, because these usually cost substantially more than \$100,000 to purchase and thousands of additional dollars annually to operate and maintain. Smaller libraries usually cannot afford these costs nor do they need the power available from minicomputer-based systems. When microcomputers became popular in the early 1980s, an entirely new market opened for automated library systems. For the first time, the development of inexpensive software that operates with inexpensive hardware made it possible for smaller libraries to automate their circulation procedures.

Online patron access catalogs (OPACs) are a more recent development compared to circulation systems. In the early 1980s only two commercial vendors of minicomputer-based automated systems offered online catalogs. Several other libraries developed their own OPACs. The first microcomputer-based online catalog also appeared in the early 1980s. Because of costs and technical constraints, a majority of libraries that currently have automated circulation systems have not yet implemented online catalogs. Some vendors of microcomputer circulation systems still do not have online catalog software.

Although the library community emphasizes the automation needs of larger libraries, there are more microcomputer-based automated systems currently in operation than minicomputer-based systems. The majority of the micro-based systems are in school and special libraries while most of the larger mini-based systems are in public and academic libraries. Because there are far more small libraries than larger libraries, the market for microcomputer-based systems should continue to grow at a faster rate than the market for minicomputer systems. Currently, there are about 20 vendors of microcomputer software programs for circulation systems, online catalogs, or both. The cost and sophistication of the programs available and the level of vendor support for their programs vary dramatically.

Should a Small Library Consider a Microcomputer-based Automated System?

The differences between *microcomputer*-based automated library systems and *minicomputer*-based systems are noted throughout this publication. Readers are cautioned not to mistake one type of computer with the other. Libraries that do not fit the definition of "small" libraries will have to consider the more expensive and powerful automated systems that operate on minicomputers. Minicomputer-based circulation systems support libraries with over five million annual circulations. Such high circulations are still well beyond the capabilities of current microcomputer hardware. In the last several years the introduction of "super-microcomputers" and "down-sized" versions of minicomputers has blurred some of the traditional distinctions between micro and minicomputers. Other factors that distinguish between micro and minicomputers include costs, sophistication of the circulation and OPAC software available, and the development and marketing of the automated systems for each type of computer.

The following questions should help determine whether a microcomputer-based automated system is a viable option. While there are always exceptions, an affirmative answer indicates that a microcomputer may be preferable. These questions should be used only as general guidelines and do not imply that there is a microcomputer-based system that is acceptable for a particular library. More detailed answers to some of the questions below can be found in Chapter Two.

1. Will the automated system be used in one library only or shared with other libraries (including different schools in a district)? Sharing an automated system almost always necessitates a minicomputer-based system. Sharing a system includes having one central database and immediate access to the cataloging data and circulation status of any title held by any participating library.

2. Are there less than 80,000 titles in the library's collection? This is the approximate upper range in collection size that can be realistically supported with most micro-based systems. This number will continue to increase as microcomputers become more powerful. The upper range in titles is especially important in a public library that plans to automate both circulation and the catalog. (Some micro-based systems have an absolute limit on the number of titles they support which is less 80,000.)

3. Is the annual circulation less than 250,000? This is the approximate upper range in circulation that can be realistically supported with most micro-based systems available today. Again, this will increase as microcomputers become more powerful.

4. Does the automated system need less than eight work stations (additional microcomputers)? Most micro-based systems have fewer than eight microcomputers connected together through a local area network (LAN). Networking too many micros can slow the automated library system to unacceptable levels.

5. Is there less than \$75,000 to budget for an automated system? This is the approximate minimal cost for purchasing a minicomputer or super microcomputer-based automated system. This covers only the initial costs for hardware and software. The total costs to make the system operational can increase the initial cost by 50 percent, or more.

6. Will an automated system with a limited number of features and only a circulation system and an OPAC program be sufficient? The more comprehensive minicomputer systems offer the widest range of features and other programs (for example, acquisitions, serials control, materials booking, etc.).

All of Wisconsin's 1,650 public school library media centers and 320 of the state's 372 public libraries have less than 80,000 unique titles and circulate less than 250,000 items annually. Depending on the features these libraries require from circulation or cataloging software, each one may meet the definition of a "small" library. Two basic questions will determine the acceptability of any automated system in a library.

Does the microcomputer hardware have the capacity and performance to adequately support a circulation system and online catalog? Capacity and performance help determine whether the microcomputer hardware can meet a library's needs for an automated library system. These two elements are influenced by several factors, some of which were mentioned in the previous section, including: the library's collection size, number of circulations, and the functions (circulation, catalog) to be automated. In addition, the actual configuration of the hardware including the microcomputer's microprocessor and its clock speed, size and speed of the hard disk, and the local area network play a critical role in determining a system's capacity and performance.

Some vendors of micro-based automated systems have an absolute capacity on the collection size that their systems support. If the maximum capacity of a given system is 45,000 titles, a library with more titles than this obviously can eliminate the system from further consideration. Other vendors claim their systems will support millions of titles, or are restricted only by the size of the hard disk used to store programs and data. Current microcomputers have over 1 billion bytes (1 gigabyte (GB)) of hard disk storage will technically support a very large number of titles. However, the titles that can be realistically supported by the system are often considerably lower than the high numbers claimed by some vendors.

Acceptable hardware is not just determined by the capacity of the hard disk to accommodate a library's collection, it is also critically related to the hardware's performance. An academic library with 150,000 titles may have an acceptable micro-based circulation system because it only circulates 50,000 to 70,000 items during an academic year. A public library with the same number of titles may circulate ten times more items annually than the academic library. The microcomputer that adequately supports the circulation of the academic library may be totally unable to support the workload demanded from it by the higher circulation of the public library. When the realistic capacity, either in the number of titles or workload, of an automated system is exceeded, its performance suffers (as does the staff).

The number of functions that need to be automated has direct impact on whether a microcomputer-based system can be viable. The microcomputer that performs adequately for a circulation system may be totally inadequate with an online catalog because the additional work that the micro must perform for a second function cannot be done in a timely manner. In addition, automating these two basic library functions generally implies having several microcomputers networked together so that both functions can be operational at the same time. The added workload of supporting a local area network will have a direct impact on the system's performance.

An automated system's *response time* is often used as a basic measure of its performance. Response time is defined as the elapsed time between entering a command or function (for example: wanding a barcode or pressing the <Enter> key after typing an author's name) and the automated system's response (by beeping or displaying the results of a search request on the screen). As the microcomputer hardware is asked to do more work, such as processing more circulations or catalog searches, it simply takes longer for that work to be completed. At some point, response time slows to an unacceptable level. Slow response time is one major reason why larger libraries cannot implement acceptable automated systems using microcomputers.

All library automation systems have a realistic limit on the number of titles, circulations, and functions that they support. The absolute limits are often much higher than the realistic, or acceptable, limits. There can be a substantial drop in performance as a system reaches its maximum capacity. The realistic limits of a system become especially important in relation to the "peak load" that is placed on a system. In some libraries the peak load, that is, the time during which there is maximum activity on the system, may be more than eight to ten times the average load. A system with an acceptable response time during normal operations can be unacceptable at certain times in a day when more items are being circulated and all of the online catalog microcomputers are in use. The hardware must be capable of handling the increased workload during peak times without its response time slowing to unacceptable levels.

The task of finding acceptable hardware for a micro-based automated system is somewhat easier for school library media centers and most special libraries as they seldom approach the maximum capacity or limits in collection size and circulations. Libraries with a collection and circulation that places them near these limits encounter the most difficult choices when reviewing their automation options. Libraries in this position, usually public and academic libraries, often find themselves on the borderline between the definition of a "small" library and something larger which pushes the current limits of microcomputer technology. Any library in this position is pushing the current limits of microcomputer technology to accommodate its needs for an acceptable automated system.

More automated systems probably have been judged unacceptable because of their deficient capacity or poor performance than because they lacked some desired software features. It is better to have an automated system that has only 80 percent of the desired features than to have a system that can acceptably manage only 80 percent of the circulation.

The ability of microcomputer hardware to support larger collections, higher circulations, and additional micros networked together will increase substantially with the introduction of more powerful microcomputers. Until these are available, libraries obviously have to accept current hardware.

Does the library software include all the features required for a circulation system and online catalog? Some librarians will not find any microcomputer-based systems acceptable because they want too many specific features that are not available in the microcomputer circulation and online catalog software currently marketed. The most powerful supercomputer will not solve the automation needs of the smallest library if it does not have acceptable software for the job.

To accommodate the variety of features that different libraries require from an automated system, vendors have developed software that is "parameter" driven. Parameter-driven software, especially circulation software, has many options to meet the specific needs of any library. Determining what features are needed from a circulation system or online catalog and evaluating vendors' software programs are two of the more difficult and time-consuming aspects of the automation process. No one should compromise on features deemed essential but it is often necessary to compromise on features judged highly desirable due to the high costs of establishing a system. Remember, this is the library's first automated system and it will not be the last. At a future time, the staff will want to install a better system that includes other features not found in the initial system. It is also important to remember that when reviewing and selecting automated system software, some compromise is always necessary. Librarians waiting for perfect circulation and online catalog software will wait forever.

Most of today's micro-based software for circulation systems and online catalogs reflect the vestiges of earlier hardware constraints. That is, the software was originally designed and written to operate on far less powerful microcomputers. Rewriting software to add new features which take advantage of recent advances in hardware is a very time-consuming and expensive task because software development always trails hardware development. Unfortunately, the software that currently exists does not completely utilize the computing power available in the latest generation of microcomputers.

The majority of micro-based library automation software now commercially marketed was originally developed for use in school and special libraries. The functions, options, and even the wording of the instructions or messages displayed on the screen often reflect this fact. Therefore, these libraries often have a better chance of locating acceptable software because vendors' programs already have many of the features they need. Some librarians may be tempted to develop their own circulation and online catalog software to circumvent the limitations they find in the programs available from automation vendors. Except in the most unusual of circumstances, developing individual automated system software is not recommended. This issue is addressed in more detail in chapter two, question five.

As librarians review their options for automating circulation and the catalog they may also want to explore other programs that will assist in handling routine tasks. Special or academic libraries may be very interested in microcomputer programs for serials control. There are also programs available for automating acquisitions, materials booking, and a host of other library tasks.

Automation Concerns That Confront Small Libraries

The decision to implement an automated circulation system or online catalog always involves risks. This is true regardless of the type or size of a library. However, smaller libraries implementing *microcomputer* systems face some specific concerns not often encountered by larger libraries implementing *minicomputer* systems. These concerns, which are outlined below, are broadly based on the nature of the technology, the nature of the marketplace, and the nature of small libraries.

The nature of the technology:

- Some librarians expect microcomputers to have the same degree of power, speed, and the ability to manage substantial amounts of data (i.e. large collections and circulations) that can only be done on minicomputers.
- In part, because of constraints imposed by the technology, software for micro-based library automation systems often lacks the sophisticated features and range of options available in minicomputer library systems.

- Microcomputers, unlike minicomputers, were initially designed to run one software program at a time and to be used by one person at a time. To implement both a circulation system and an online catalog places additional burdens on the hardware and creates another level of complexity that must be addressed.
- Because of the multitude of hardware options available and the increasing complexity of hardware, it can be very difficult to know the limitations and compatibility problems inherent in any specific hardware configuration.
- It is difficult and time-consuming to keep up-to-date with the rapidly changing technology and to understand the implications of those changes for automated library systems.

The nature of the marketplace:

- Because it is a relatively new market, librarians must tolerate the changes, mergers, and disappearance of vendors.
- Vendors of micro-based systems seldom sign contracts with libraries. This leads to misunderstandings over the obligations and responsibilities of the library vs. those of the vendor. Related to this, a performance bond, which is a form of insurance for the library to help guarantee that the automated system does what the vendor claims, is nonexistent in the microcomputer market.
- There are few micro-based vendors that supply both hardware and software ("turnkey" vendors), as is common with vendors of minicomputer systems. This can cause problems in having to work with several vendors throughout the lifecycle of the automated system.
- Many vendors do not have national sales representatives and often cannot give on-site demonstrations of their programs. Travel and related costs may be more than the profit margin from the software, assuming they were to actually make a sale. Interested parties may have to travel a considerable distance to attend a demonstration or to see the system in operation.
- Many micro-based vendors have limited staff and the level of initial and ongoing support may be minimal. Some vendors do not offer on-site support for installing the system.
- Most vendors' systems do not fully support the Library of Congress MARC (Machine Readable Cataloging) standard record format. This has major implications for a library's current and future automation efforts.
- Most vendors developed microcomputer-based systems for school and special libraries. Public or academic libraries may not find all the features they need for an acceptable system.
- Hardware manufacturers seldom provide technical support for their microcomputers. This support is provided through a local dealer or a third-party support firm, and the level of support can vary substantially.

The nature of small libraries:

- Small libraries simply have less staff to allocate for planning, selecting, and implementing an automated system than large libraries do.
- Staff in small libraries often have less opportunity to attend workshops and continuing education programs on library automation, or to attend automation-related conferences.
- Small libraries often lack funds to hire a consultant to assist them with their automation planning and system selection. While a micro-based automated system may cost one-tenth of the amount of a mini-based system, consultants cannot lower their fees by a similar amount.
- Staff considering microcomputer systems almost never send vendors a Request For Proposal (RFP) that defines exactly what is needed from an automated system. This makes it difficult to judge whether any system will meet their needs and to evaluate the differences between vendors' systems.

- The staff rarely demand any testing of a micro-based automated system before payment. The vendor sends the library an invoice along with the circulation or catalog software which is often paid before the software is installed and operational.
- Many small public libraries and school media centers have Apple microcomputers. Staff may not be familiar with the IBM PC or PC compatibles that are used in almost all micro-based systems. Yet, because there are few turnkey vendors, the library staff are still responsible for hardware selection and may be responsible for its installation.
- Staff in smaller libraries are not often intimately familiar with MARC records. They may not be fully aware of the value of MARC records, how MARC records are used in an automated system, and the impact that their use, or misuse, has on the library's current and future automation efforts.

Automation Concerns That Confront All Libraries

The concerns listed above increase the risks for smaller libraries as they investigate microcomputer-based automated systems. There are additional automation concerns and issues that all libraries confront regardless of their size.

Library automation is disruptive: Automating a major library function, like circulation or the catalog, is initially disruptive. The level of disruption – and how staff manage it – is highly dependent on the degree of communication among staff and the thoroughness of the planning that precedes the system's implementation. Murphy's Law seems to pervade library automation projects, and the unforeseen situations often cause the most problems. Thorough and careful planning can reduce these to a minimum. Also, simply knowing that disruptions do occur and that unanticipated problems have to be solved will help staff through the automation process.

Library automation takes time: Regardless of careful planning and flexible timetables, any automation project may take longer than originally anticipated. All timetables must be flexible enough to accommodate the delays that inevitably occur. Within the limited staff resources in small libraries, time must be found for a myriad of activities including: determining automation needs, reviewing automated systems, converting collection and patron data, barcoding items for circulation, and installing the hardware and appropriate software. At times the entire automation process seems infinite but any time prudently invested "up-front" will save even more time in the future.

Library automation is complex: Automating major library functions like circulation or the catalog is a complex process. It is essential that staff involved with evaluating, selecting, and implementing the automated system understand the complexities and the implications of all the decisions they must make. Attempts to simplify the complexities can result in superficial knowledge that leads to less than desirable results. A benign "hands-off" approach by staff is not only irresponsible but also guarantees that some critical factor will be overlooked.

Library automation demands a commitment: In most small libraries the director will be responsible for the automation project. It is imperative that individual directors and the library's governing body be committed to the success of the automation project. This sense of responsibility must be instilled in other staff members who will be involved, directly and indirectly, in the project. The commitment may be in the form of higher work priorities for planning and implementation of the system and the realization that other regularly assigned tasks must take a lower priority. More than one automation project has floundered

because key staff have balked at assuming the workload associated with the automation project.

Library automation requires careful planning: A major problem is coping with an unsatisfactory automated system. That is, it does not include certain features or meet expectations. This can be the most unfortunate aspect of selecting and implementing an automated system. Selecting a system that does not meet a library's needs can often be traced to inadequate planning. This includes the failure to list specifically what features are required from an automated system, what level of performance is expected, and then basing system selection accordingly. Another common fault is concentrating only on short-term objectives and failing to consider possible long-term needs. There is no easy method for selecting an automated system unless a library enjoys taking unnecessary risks and living with the consequences.

Summary

It cannot be assumed that small libraries have no need for an automated system. Automating the circulation process and the catalog can be very beneficial for staff and patrons in most libraries regardless of their size. The challenge that small libraries and schools confront is locating an acceptable microcomputer-based circulation system and online catalog. The acceptability of a system is based on the capacity and performance of the hardware and the features available in the circulation and online catalog software. Determining what is and is not an acceptable automated system for any library takes time, perseverance, and an ability to work with detail.

Chapter 2

Automation Questions Often Asked in Small Libraries

Listed below are automation-related questions most frequently asked by librarians who contact the Division for Library Services for assistance. The questions and their accompanying answers cover a variety of topics concerning microcomputer-based circulation systems and online catalogs. Several of the questions parallel those listed in the previous chapter.

Will more than one library share an automated system?

In almost all circumstances a single microcomputer-based system cannot be shared by several libraries. A shared system almost always implies the selection of a larger and more expensive minicomputer-based system. Although the cost of a minicomputer system is substantially higher than a microcomputer system, the cost can be shared by the participating libraries. If a school district has over ten media centers, it may be less expensive to purchase a minicomputer-based system than to purchase ten separate micro-based systems for circulation and the online catalog.

There are many advantages to sharing an automated system and this option should always be explored. Sharing an automated system makes it easy to share resources because it is easy to determine whether a library using the system has an item not held by another library. Another major advantage is that an individual library is seldom totally responsible for the automated system. In most shared systems, a system manager (usually working at the library where the minicomputer is located) has overall responsibility to make certain the system is functioning properly. This arrangement can be advantageous for smaller libraries without the staff time or expertise to assume complete responsibility for the implementation and ongoing operation of an automated library system. Problems associated with governance, funding, telecommunications, personalities, and conflicting philosophies of library service frequently prevent the successful implementation of shared automated library systems.

Is having dial-access the same as sharing an automated system?

Having dial access to search other libraries' collections is not the same as having a fully shared system. The possibility of having dial access is particularly attractive to school districts. Many school districts want to create a union catalog of all the district's titles and allow participating schools to dial into the union catalog to determine what school owns a title not locally held. While this may be a laudable goal, there are very few microcomputer-based systems that allow dial access and fewer still that can function as a union catalog. If this type of feature is necessary, there will be less vendors' automated systems to consider. In addition, it will be necessary to maintain both the union catalog and the separate catalogs and automated systems at each individual school. The logistics and time necessary to maintain both the union catalog and separate automated systems at each individual school should not be underestimated.

Are there some libraries that simply should not consider automating?

Yes, there are many acceptable reasons why a library may decide not to automate. For some libraries the benefits of automation may be minimal and the need for it is debatable.

In some small libraries the low level of activity and minimal open hours often do not justify the expense and time needed to automate. Libraries that lack community support or the support of their governing body often make poor automation candidates. The low number of staff and lack of staff expertise or interest preclude some libraries from automating. Many libraries have other priorities like increasing staff, providing more open hours, and having larger materials budgets, that are currently more important than implementing automated systems.

What vendor's automated system is preferable?

When reviewing the entire automation process, selecting the best automated system is the most important priority. Unfortunately, a librarian commonly makes decisions based solely on the system selected in a neighboring library. System selection is sometimes based only on rumors because of a lack of time.

An automated system used in one library will not automatically be the best system for another library. To allow one library to, in effect, select the automated system for another library cannot be realistically described as a selection "process" but rather as irresponsible and shortsighted. Select the system that best meets the needs for a specific library because it is that library - not some other library - that must live with the system once it becomes operational.

To help determine the best automated system for a library it is helpful to develop a checklist of all the features needed from an automated circulation system and online catalog. (A detailed list of possible features can be found in Section 2.) The failure to list the basic features needed from the automated system will increase the risk of omitting some important factor when judging an automated system. Not having some kind of list also makes it difficult to accurately judge the differences among vendors' systems.

Should library staff consider developing their own programs for circulation and the catalog?

No! Seven or eight years ago this was a more viable option but it is no longer. Librarians should thoroughly investigate the programs already available before considering getting involved in a software development effort. They should also politely but firmly reject offers by well-meaning students, teachers, or patrons to write a circulation or catalog program for their library. Development of local software is an arduous, time-consuming process. Programmers not familiar with library procedures usually underestimate the complexity of library operations and the programming task that awaits them. Conversely, librarians who have never programmed seldom appreciate the difficulties of writing software to automate circulation or the catalog. Most "home-grown" automation efforts result in programs that are considerably inferior to programs commercially available. This option is fraught with other problems including development of specifications, ongoing support, and program enhancements. In brief, it is better to select a software package for circulation and the online catalog that has already been developed and is available through a commercial vendor.

Should libraries consider a microcomputer-based circulation system that still uses floppy disks and not a hard disk?

No. Hard disks are no longer a major expense and the advantages they offer in storage capacity and speed make them far superior to floppy-based circulation systems. With a floppy-based system the user has to shuffle floppies in and out of the disk drives to conduct many circulation-related procedures such as printing overdue notices. The more

sophisticated and powerful microcomputer-based programs cannot be operated using just floppy drives.

Should staff consider a CD-ROM-based online catalog?

There are several vendors that have developed online catalogs based on CD-ROM (Compact Disk - Read Only Memory) technology. Many of these catalogs offer sophisticated searching options not always available in the microcomputer-based OPACs that operate using traditional magnetic media. CD-ROM catalogs are separate self-contained units. Each searching station includes a PC with a floppy and/or hard drive and a CD-ROM drive. The CD-ROM catalog stations are not networked together. Costs for CD-ROM catalogs vary considerably from vendor to vendor.

CD-ROM is a read-only medium which means that the data on it cannot be changed once the disk has been created. Therefore, the issue of catalog maintenance is critically important. This includes cataloging data for new acquisitions, and deleting data for items weeded or lost from the collection. Some vendors allow cataloging data for new acquisitions to be stored on a hard disk. When a patron enters a search, the OPAC software searches both the CD-ROM and the hard disk for any items matching the search request. A similar technique is used to identify, or "flag", items that are no longer in the collection to prevent them from being displayed. Other vendors do not offer a hard disk updating feature. The only method to get new acquisitions into the OPAC or to remove items that have been weeded or lost is to remaster the CD-ROM.

Implementing a CD-ROM-based OPAC does not solve a library's need for an automated circulation system. Librarians must know what options they have for an automated circulation system before they make a decision to implement a CD-ROM online catalog. Several vendors have or are developing circulation systems to complement their CD-ROM OPACs. The circulation software stores all the circulation data on a hard disk. Some CD-ROM OPAC vendors are developing interfaces between their CD OPACs and other vendors' circulation systems. As noted in Chapter One, purchasing an OPAC from one vendor and a circulation system from another vendor is usually not recommended.

Should circulation be automated before installing an online catalog?

The question of which software module to install first, the circulation system or the online catalog, has critical implications for the future of the automated system. In most libraries, regardless of size, it is difficult to allocate enough staff to implement both the circulation system and the online catalog at the same time. Some libraries also find they cannot budget for both circulation and the online catalog in one budget. They must gradually administer these modules over two or more budget cycles.

Although most libraries usually automate circulation before implementing an online catalog, it is not necessary to proceed in this order. A circulation system first is a high priority for most public libraries or any library with a high volume of circulation. For many special libraries, high school media centers, and academic libraries, implementing an online catalog first may be more beneficial than automating circulation.

Regardless of which function libraries automate first, if they want both a circulation system and an online catalog they should consider a vendor that has both of these modules available as an integrated package. That is, they use one central database and can share cataloging, circulation, and other data. It is usually not cost-effective nor mentally healthy to purchase circulation software from one vendor and online catalog software from another. In addition, there are a host of technical and logistical problems that mitigate against having different vendors' systems for these two major library functions.

While evaluating circulation and online catalog software, it is important to understand the differences between circulation and online catalog databases. Most microcomputer-

based circulation systems use only a brief cataloging record which is not complete enough for use in an online catalog. It is easier to start with complete cataloging records even if the circulation system is installed first. Unfortunately, most microcomputer-based circulation programs do not allow a complete catalog record to be stored on the hard disk. If the staff initially chooses a circulation system that uses brief records, they need to be aware of the options for adding cataloging records at a later date when they decide to install an online catalog. It is essential to know the cost for this upgrade and what type of support the vendor will provide in the future before purchasing the online system.

Unfortunately, librarians often overlook the effects an online catalog will have on their patrons as they are preoccupied with their immediate need to automate circulation. As a result, upon reviewing the online catalog, they realize that it is too difficult or confusing for their patrons to use which can be extremely frustrating and demoralizing. If the circulation vendor's OPAC is inadequate, the library will be forced to continue with its card catalog or to change vendors for both the circulation system and the OPAC. This latter option is seldom realistic for smaller libraries. Implementing an OPAC after automating circulation almost always necessitates a major hardware upgrade including the costly installation of a local area network (LAN).

Is it possible to save money and staff time by automating?

Whether automated systems save money is open to individual interpretation. Studies have been conducted, admittedly mostly in larger libraries, showing that cost savings can occur over a five to seven year period. However, other libraries realize little or no savings. Very few libraries can actually decrease their operating budget by implementing an automated system. At best, it is a matter of keeping the budget increase below the increase needed if the library did not plan to automate.

It is definitely possible to save staff time by automating but this is not the same as eliminating staff. In most small libraries it will be almost impossible to actually cut back on the number of full time equivalent (FTE) staff. Any time that is saved as a result of automating the circulation or catalog is usually reallocated to some other useful function within the library. The director should not justify installing an automated system to the governing body with the promise of reducing the staff. A better justification is more beneficial use of current staff.

What is retrospective conversion and why is it necessary?

Before any items can be circulated using the automated system or located using an online catalog, the cataloging data for each title in the collection must be entered into the computer. It is important to understand the options available for converting cataloging data and the implications of each option on any future enhancements to an automated system. In a larger context, some libraries may want to consider how their conversion options affect their relationships with other libraries for resource sharing and in other cooperative efforts. More information on retrospective conversion and MARC records can be found beginning in Chapter Four.

What kind of microcomputer does the automated system need?

Most of the microcomputer circulation systems and OPACs currently available run on IBM PCS, ATS, PS/2, or compatible hardware. Very few vendors currently have systems operating with the various Apple II models. Several vendors have recently developed circulation and online catalogs for the Apple Macintosh. At this time the Mac-based programs are not as well developed as the PC-based programs. This will change as vendors

devote more of their programming resources to enhance their Macintosh automated library systems. For more specific information on hardware issues see Chapter Eight.

What happens when the automated system is not working?

Any automated system can fail for a wide variety of reasons. The library must have a contingency plan developed for such failures even before the automated system becomes operational. When the automated circulation system malfunctions, it is important that staff working at the circulation desk know exactly what the back-up circulation procedures are and be able to implement them immediately. Some libraries retain the rudiments of their old manual circulation procedures to use in an emergency. Many libraries simply copy, on a worksheet, the barcode number from a patron's card and the barcode numbers from the items the patron is checking out. The numbers can then be entered on the keyboard when the automated system is again functioning. Several vendors have developed portable, battery-operated bar wands to record circulation transactions when the system is down. Data is then uploaded from the portable reader into the circulation system when it becomes operational.

A contingency plan for collection access is also needed when the online catalog is not functioning. At a minimum, a library should have a two or three page flyer available with an outline of the broad Dewey or Library of Congress classifications and the range of their appropriate call numbers. If possible, additional staff should be available to directly assist patrons.

To help prevent actual loss of data when the system crashes, it will be necessary to have a regularly established routine of backing-up all the data on the hard disk. Unless the library has a very small collection, backing-up data to floppy disks is time consuming and not recommended. A more efficient solution is to back-up data using a streaming tape drive. It may not be necessary to back-up data in all the files everyday. It takes less time to back-up only selected files, such as the circulation files, that have changed since the previous back-up. This eliminates the need to copy all the files from the hard disk to tape. There are numerous back-up programs commercially available. Some automated systems come with their own utility program for copy data. A staff member should be assigned the responsibility to make certain that back-ups are made on a daily basis.

Is it a good idea to contact several libraries that are currently using different systems?

Always contact at least two or three libraries currently using the system under consideration before making a final decision. Questions should be directed to a library with similar needs and a comparable collection size, number of circulations, and related details. If possible, see the system in operation and talk to the library staff to get their impressions. Ask staff why they selected the system they have and what problems have they encountered in using the system. For example, what features do they like and dislike about the system? What problems have they had with the vendor, including any problems related to support after the sale? If the library were to automate again, would they purchase the same system? If a vendor is reluctant to provide any libraries to contact for references, consider another system. Also, ask library users or the vendor if there is a user's group and whether they publish a newsletter.

How much staff expertise will it take to install the system once the software and hardware arrives?

Once the staff has selected the automated system, the hardware will have to be connected and the software installed. The party responsible for the hardware set up and software

installation will depend on the services offered by each vendor. The setup and installation procedure can be time consuming and frustrating without on-site assistance from the vendors. Most hardware and software vendors will setup and install the system but the library may be charged for this. Be aware of the costs and what is covered in any hardware setup and software installation fee.

Clear and concise documentation is absolutely essential if library staff will be doing the initial installation themselves. The staff person setting up the hardware and installing the software must have experience with the type of microcomputer purchased, its peripherals (printers, disk drives), and the computer's operating system (to copy files, create directories, etc.). If no one on the library staff is comfortable with handling these initial responsibilities, the vendors should do the hardware setup and software installation.

The local area network (LAN) installation process includes physically stringing cable to each microcomputer, loading the LAN software onto the hard disk, customizing the LAN for library use, and testing the LAN to make certain it is functioning properly. In most libraries it will be better to have the local LAN dealer actually install it. An experienced technician can usually install a LAN in only a day or two. The installation process for inexperienced library staff can be time consuming, complex, and frustrating.

After the software is installed some vendors will provide staff training on use of the circulation system and online catalog. Some vendors include the cost of training as part of an installation package. Be aware of the options the vendor has and what the costs are for staff training before actually purchasing the software.

It usually does not require the same level of expertise to keep an automated system functioning on a daily basis than it does to initially make it operational. However, this does not mean that the system will run by itself. It will be necessary to have at least one staff member responsible for the system's operation including such tasks as the ability to diagnose and correct simple problems, conduct regular back-ups, train new staff members, and serve as a vendor contact.

Have all the problems associated with implementing an automated system already been solved in order to install a system with little difficulty?

Don't bet on it. While many of the technical problems encountered when implementing an automated system have been solved, others will appear that no one, including the vendor, have yet confronted. This is especially true as microcomputer-based hardware and library software becomes more complex and demands an increasingly higher level of support from the vendor and the library staff. The determination of what does, and does not, constitute a "problem" is highly dependent on individual interpretation.

Chapter 3

Planning and Evaluating Microcomputer-based Automated Systems

Planning for an automated system should be part of an overall long-range plan of the library. In too many libraries the automation project drives the library's priorities and becomes an end in itself. Automation should always be used as a means to achieve other goals such as better accountability of items in circulation or improving access to the collection. This chapter is not intended to be a detailed planning document but a guide to the basic steps related to library automation planning. The decision to automate is only the first step, there is a considerable amount of work that must be done before the circulation system and online catalog are operational.

Communication and Commitment

The person in charge of coordinating the project must be willing to accept the responsibility and to make a personal commitment to the project. This person may be the library director, the school's district media director, or a school building-level media specialist.

Along with the technical issues of the automation project, it is the responsibility of the project coordinator to keep the channels of communications fully open to all staff members throughout the automation process. Too many times staff are not fully informed and, as a result, rumors supplant facts. Concerns about job security, changed responsibilities, and imagined fears of automation become more important than work responsibilities.

Staff who are most familiar with the circulation and catalog functions of the library must be directly involved in the planning process. This includes paraprofessional staff or students who often have the greatest familiarity with the day-to-day work involved in circulation and cataloging.

It is equally important to have the complete and active support of the library's governing body (the board of trustees, board of education, etc.). A firm commitment from both the staff and governing body is necessary in order to insure the success of the automation project.

Defining the Problem

It is important to understand fully all current circulation or cataloging policies and procedures and to be able to identify the problems associated with them. What are the basic problems or limitations associated with the methods currently in use? How much does it cost in time, labor, and supplies to maintain the current circulation system or catalog? Information of this type is often needed to educate the board or principal on the problems inherent with current circulation practices and the card catalog.

The introduction of an automated system often presents a good opportunity to change or reorganize the work flow and staff responsibilities in the area of circulation and cataloging. In fact, to make the most efficient use of an automated system, some degree of reorganization will be essential. However, implementing an automated system should not be viewed as a means to solve problems that are caused by inefficient use of limited staff resources or by ineffective management. Problems of this type should be handled within the context that they occur. To impose an "automated" solution for these problems often leads to the development of unhealthy attitudes toward the automated system and, in the end, the problems are seldom solved.

Even though this publication focuses on circulation systems and online catalogs, the coordinator should conduct a more comprehensive review of a library's automation needs. There are many other functions in the library that can benefit from automation, ranging from using spreadsheet programs for budgeting to providing microcomputers for patron use.

Identify and Evaluate Alternatives

Examine any options that are available to solve the most pressing problems associated with circulation and cataloging. Are there any unnecessary steps or procedures currently done that can be eliminated? Simply because some particular procedure has always been done does not necessarily justify continuing it. It may be possible to reorganize the work flow to make circulation or cataloging more efficient without having to fully automate these two tasks.

Other automation programs can also help make the circulation and cataloging process more efficient. If overdue notices require considerable staff time, an inexpensive software program can produce overdue notices. If a staff member still types catalog cards, investigate purchasing card sets from book jobbers and card production software. These two alternatives provide neither a fully automated circulation system nor an online catalog but they can be implemented quickly, are inexpensive, and can save a considerable amount of staff time.

Evaluate various options and list the advantages and disadvantages of each. Determine both the estimated initial and ongoing costs of implementing each option. Be certain to include the costs for staff associated with each option.

Develop a Long-range Focus

When determining needs and priorities, and identifying automated alternatives to fulfill those needs, it is important to consider both long and short-term objectives. Often a decision made in the short-term has an adverse or unforeseen effect on longer term automation needs. A very common example of this problem is a catalog conversion. In the desire to get a circulation system operational, library staff enter only brief cataloging data. Only later do they realize that a far more complete cataloging record is necessary for an online catalog. Thus, the conversion decisions made for the more immediate need of implementing a circulation system can adversely affect the long-term needs for an online catalog.

Steps to Consider When Automating

Listed below are some of the key steps or factors to consider when planning and implementation process for an automated circulation system, online catalog, or both. Although the steps are presented in a basic chronological order, the exact sequence of the steps will vary depending on local circumstances and the particular system itself. Some of the steps listed may not be relevant to all libraries. Some processes, like retrospective conversion, require considerably more staff time and resources than others.

Conduct a basic review and needs assessment of the circulation and catalog areas to determine the extent of the problem.

Inform and educate the board or governing body, stating the current procedures for circulation and cataloging and the problems associated with them. Briefly outline the advantages of automation and how it can help solve some of the current problems. Get their support to start planning for automation and keep them closely informed throughout the

planning process. In schools, automation activities should be an integral part in the K-12 library media center's long range plan.

Establish an automation committee composed of staff who are involved directly with circulation and the catalog and chaired by the director, district media person, or another high-level staff person. If possible, include a board member on the committee.

Determine the estimated costs and the approximate timetable to review, select, and implement an automated system. Obviously, it is important to understand and work within the constraints and timeframe of the budget cycle and staffing availability.

Present the estimated generic costs and timetable to the board for their review and approval. The question of cost is often asked early in the planning process. It should be possible to develop a tentative "ball park" figure by talking with vendors and other libraries that have already automated their circulation and catalog. Remind the board that those are not specific costs for a vendor because the actual system has not yet been selected.

Weed the collection.

Conduct retrospective conversion of paper shelf list to a machine-readable form.

- Explore conversion programs and options.
- Select a specific MARC-based conversion program.
- Train staff and begin the conversion process.

Retrospective conversion (the conversion of cataloging information from a three by five catalog card into a computerized format) must be done regardless of which automated system is eventually selected. This labor-intensive process should begin as soon as possible.

Consider barcoding options. Patrons can be registered and barcodes applied to their cards. The timing and methodology used for barcoding the collection and patron cards is highly dependent on the method of conversion used and the vendor's system that is selected.

Prepare a System Evaluation Checklist. Establish a list of mandatory and optional features.

Begin investigating circulation and online catalog software programs.

- Read the literature.
- Attend conferences, automation workshops, and programs.
- Requesting information from vendors (including a demonstration disk of their system and a videotape).
- Attend or arrange for vendor demonstrations.
- Contact and visit libraries that have already installed automated systems.

Solicit specific vendor information based on a System Evaluation Checklist. Send this checklist to selected vendors and ask them to check what features their systems currently have.

Evaluate the automated systems available and make a tentative selection based on

- the ability of the vendor to meet the library's needs as outlined in the checklist
- the overall reputation of the vendor including:
 - level of customer support
 - level of customer satisfaction (contact libraries that have the vendor's system)
 - number of installed systems
 - a regular schedule for the release of new versions of their software

- the ability of the vendor's system to accept MARC records (assuming the library's cataloging records are in the MARC format)
- operation of the system in a library
- all costs
 - initial and ongoing over at least five years
 - hardware
- In most circumstances the library will be purchasing hardware and the local area network (LAN), if applicable, from a local dealer and not the library software vendor.

Review the physical facility and determine where the microcomputer(s) will be placed and whether there is any need for site modifications and what the needs are for security, wiring (including separate electrical circuits), remodeling, etc.

Inform the board or governing body of more specific cost figures. Receive their approval to continue the process.

Contact the selected vendor and resolve any outstanding issues and questions. Put into writing any agreements or understandings that are made. Have the vendor sign the checklist of features.

Complete retrospective conversion. If the library is participating in WISCAT contact the Division for Library Services to get the date for the next scheduled MARC record extraction. This process often takes three to four months.

Make a final decision on the vendor and get final board approval.

Depending on the budget cycle plan for implementation:

- place an order for the software with vendor
- select and order hardware and peripherals based on recommendations from the software vendor, and
- order any other necessary supplies, including barcodes.
- Depending on local circumstances, it may not be fiscally prudent to purchase the software, hardware, or other items if it will be months before any specific component is implemented. The software warranty may expire before the system is operational.

Develop public relations information to alert patrons to the new system.

Prepare the physical site for system installation (physical modifications, electrical wiring, cabling for the local area network, lighting, security considerations, workstation furniture, etc.).

Arrange with the local vendor for the hardware equipment set-up and testing including installation of the local area network, if applicable.

Load MARC records into the hard disk from floppy disks or magnetic tape. Some vendors prefer to do this themselves as they install the software. Transferring the data from MARC records into the local system is often a source of problems. Work closely with the vendor to insure that this process is done correctly.

Arrange with the library software vendor to install the software modules (circulation/catalog) and to train the staff.

If automating circulation:

- As part of installing the circulation software, set up circulation parameters using the options available from the circulation software for collection types, fines, circulation periods, dates closed, etc.
- Type or transfer patron data from another source (e.g. student records) into the automated system.
 - Register patrons and apply barcodes to patrons' cards.
- Apply barcodes to physical items and link barcodes if using "dumb" barcodes.
 - As previously noted, the timing and methodology used for barcoding the collection and patron cards is highly dependent on the method of conversion used and the vendor's system that is selected.
- Apply barcodes if using "smart" barcodes
- Develop back-up procedures for use when the automated system is down

If automating the catalog:

- If not previously done, install, or have the vendor install, the local area network to allow additional microcomputers to search the online catalog.
- As part of installing the catalog software, define what is to be indexed for searching based on what was stated in the checklist.
- Edit the cataloging records as needed. (Libraries often underestimate the amount of editing needed.)
- Develop flyers, training programs, and other materials to assist patrons in using the OPAC.
- Develop back-up procedures for collection access to be used when the OPAC is not functioning.

Test all functions. Verify that the system has the features that the vendor claimed in their response to the checklist.

Train staff who did not participate in the initial vendor training.

Start using the automated circulation system.

Evaluate the automated circulation system and make any technical and policy adjustments.

If automating the catalog, introduce the online catalog to patrons, conduct training sessions, and distribute flyers and other guides for patrons to use. Publicize the system to the community.

Have patrons start using the online patron access catalog.

Evaluate the automated system and make any technical and policy adjustments.

Plan for future system upgrades and enhancements.

Issues Associated with Costs and Potential Savings

Cost-related questions must be addressed early in the planning process. Ideally, an estimated budget is drafted after completing at least some background work. Sometimes an authority figure confronts a library or media center director with a request to put together quickly an automation budget just a few days before the budget is due. The simplest and safest answer to questions about cost is: "it depends".

The first decision is whether a circulation system is sufficient or whether the library wants an online catalog too. Many librarians assume they only want a circulation system and budget accordingly. Only later do they regret that they did not also consider budgeting for an OPAC. Implementing both a circulation system and an OPAC has many implications

including a direct impact on costs. The cost of additional hardware needed for most online catalogs can be several times the cost of hardware needed for just the circulation system.

Another major budget variable will be the cost for the circulation and online catalog software as costs vary from under \$2,000 to over \$10,000. Some vendors discount their software if libraries purchase both the circulation system and the online catalog software at the same time or if a library already has one of their modules. However, it is not necessary to purchase both modules together unless both will be installed in the near future.

For *preliminary budgeting* purposes, remember that almost all microcomputer-based systems currently operate on IBM or IBM compatible microcomputers. The exact hardware configuration will vary depending on the size of the collection and the functions (circulation and/or catalog) that will be automated. Software vendors can provide information if they know what functions will be automated and the library's collection size and circulation. Working with the recommendations from the software vendor, the staff can calculate some estimated costs based on the current source for hardware. (Appendix A lists the specific costs of a high school that installed both a circulation system and an online catalog.)

Often overlooked in budgeting are initial automation costs for retrospective conversion, barcoding, physical site preparation, supplies, staff time for planning and related activities, initial installation, and staff training. Ongoing costs that are sometimes excluded include costs for hardware and software maintenance, installation of additional hardware, and the purchase of software upgrades and system replacement.

Libraries considering minicomputer-based systems often have several different payment options offered by the vendor. In addition to outright purchase, they may also have the option of renting, leasing, or lease-purchasing the automated system. Smaller libraries considering microcomputer-based systems will almost always have to purchase outright both the software and the hardware. With careful planning, the purchases can be spread over two fiscal years.

What Is the Best Automated System for a Library?

Selecting the best automated system for a library is a major task, and a major responsibility, regardless of a library's size. When large libraries decide to automate, they may issue a formal document called a Request for Proposal (RFP). The RFP serves several purposes. First, it is used to identify exactly what a library requires from an automated circulation system, online catalog, or other automated library system. Second, it is used as a basis to make objective comparisons between different vendors' automated systems. Third, because of the costs involved, it is sometimes mandated by the library's governing authority. Fourth, the RFP process may be used to circumvent accepting a low bid. If it can be shown that the vendor with the lowest bid does not meet the features and functions stated in the RFP, that bid can be rejected. Comprehensive Request for Proposals are often considerably longer than 100 pages and it can cost a vendor thousands of dollars to develop an appropriate response. Most smaller libraries do not have the time, staff, or desire to go through a formal comprehensive RFP process to select an automated system. Besides, most vendors of micro-based systems will not respond to a minutely detailed 100 page RFP. It will cost them more in staff time to respond to the RFP than they charge for their software programs.

While the development of a formal RFP is not realistic in most small libraries, it is still very helpful to develop a succinct checklist of mandatory and optional features of the proposed automated system. This "System Evaluation Checklist" may be only three to five pages in length. This checklist can serve many of the same purposes as a full RFP, but the concise form will encourage vendors to develop an appropriate reply. Prior to sending vendors a System Evaluation Checklist, several other steps can help narrow the choice of vendors.

Guidelines for Requesting Information from Vendors

These suggestions are not designed as a substitute for a System Evaluation Checklist. However, they can narrow the focus to a few vendors, and make the task of critically judging each vendor's system easier.

1. Review literature that is available from vendors describing their automated systems. (But do not select a system based only on a description in a glossy brochure!).
2. Ask vendors for demonstration software to review and for a videotape highlighting the features of their systems.
3. Talk to vendors who exhibit their systems at library conferences. If possible, try to schedule a meeting with a vendor to spend more time discussing specific needs and how their system can meet the features that a specific staff desires.
4. Contact vendors by phone. Sometimes just asking several specific questions will determine that the vendor's system is not sufficient.

Below is an outline to help develop a System Evaluation Checklist and other relevant information that decision makers will need to know from the vendor.

1. Provide vendors with:

- cover letter of introduction
- general background information and statistics for a library including:
 - collection data
- total number of titles (not including duplicates)
- total number of volumes
- projected number of titles and volumes in five years
- number of titles already converted to MARC
- total new titles added each year (not including duplicates)
- total new volumes added per year
- number of different collections (e.g. fiction, juvenile, oversize, etc.)
 - circulation data
- number of annual circulations
- maximum circulations per hour and day
- maximum number of items on loan at any time
- maximum number of reserves (total and per item) at any time
- number of different fines
- number of different due dates
- anticipated growth over the next five years
- patron data
 - number of current patrons
 - projected number of patrons in five years
 - number of different patron categories
 - number of different legal jurisdictions
- type of statistics desired (e.g. items circulated by collection type, patron type, cataloging class type, etc.)
- automation priorities (circulation, online catalog, both)

- other information (special collections, current hardware available, unusual practices, time or budget considerations, etc.)
- contact person in the library that the vendor can call if they have any questions
- System Evaluation Checklist:
 - distinguish between features that are
 - E = Essential
 - H = Highly desirable
 - D = Desirable
 - keep any essential or mandatory features or needs to a minimum
 - be realistic, do not submit a "wish list"
 - be concise and clear
 - simplify vendor responses by providing space on the checklist for them to state whether their system has the features
 - N = Not available (no)
 - I = In development
 - A = Available (yes)
 - V = Variance, available but not exactly as stated in the checklist (vendor should provide further explanation)
- allow space for vendors to add comments
 - do not send vendors a "cooked" checklist. (A "cooked" list is a checklist of features designed to eliminate all but one vendor's system).
 - focus more on what the automated system should do rather than how it should do it.
 - let the vendors know that they will receive a request for information.
- allow enough time (at least four weeks) to respond.
- tell vendors how they will be evaluated.

2. Ask vendors to:

- correctly check the features listed on the System Evaluation Checklist.
- recommend optimal and minimal hardware configurations
- recommend a local area network (LAN), if applicable
- break down all costs, initial and long-term (five years)
- send a demonstration disk and documentation
- provide references from at least four libraries that are similar in size and that have the system fully operational
- state total number of installed systems
- state their policies on warranties, customer support, maintenance, issuing system upgrades, etc.

Note: See Chapter seven for more information on working with vendors.

3. Conduct follow-up evaluations:

- identify realistic system capacity
- check expansion capabilities
- check response times on circulation transactions and OPAC searching
- check vendor's documentation
 - for good overall organization
 - for clarity (minimal use of jargon)
 - for actual reproductions of screen images
 - for step-by-step instructions for complicated procedures
 - for an index
- contact vendors to clarify any outstanding issues (schedule a time convenient to both parties if necessary)
- if possible, see a "live" system in full daily operation in a library
- call references and ask:

- about their overall impression of the system
- any specific questions
- about vendor reliability including the vendor's response to the library's calls for assistance
- if the library would purchase the same system again
- identify who is responsible for hardware and software installation
- plan to test the system's performance before payment.

Evaluating Vendors' Responses

Libraries that develop full RFPs often have an evaluation team and a well-defined evaluation methodology to review each part of a vendor's response. Libraries that do not have time to develop a full RFP also do not have time to develop an elaborate evaluation process. However, the System Evaluation Checklist itself can be formatted in a way that allows vendors to quickly check the status of each feature in their system. Responses can be judged for their ability to meet features listed. Since not all features are equal it is very helpful to rank them as shown below.

- E = Essential
- H = Highly desirable
- D = Desirable

Other considerations like ongoing maintenance and system upgrades can also be assessed. It is helpful to develop a matrix or chart that consolidates the vendors' responses. This will make it easier to quickly compare the responses. (See Appendix B, for a model of a System Evaluation Checklist.)

To help ensure that the best system is chosen and to judge differences between vendors' systems, points can be assigned to each feature listed in the checklist. For example,

- 0 points for N = Not available (no)
- 2 points for I = In development
- 4 points for A = Available (yes)
- 4 points for V = Variance, available but not exactly as stated in the checklist (vendor should provide further explanation)

The above breakdown is only a model. Library staff may also want to establish a different numbering scheme based on the importance placed on particular modules or their features. If the online catalog is more important than the circulation system, the OPAC features can have more points or use some type of weighted evaluation (online catalog is 40 percent, circulation is 30 percent, database maintenance is 25 percent, etc.). Similarly, a "highly desirable" feature may be given more weight than one rated just "desirable." The process of developing a rating methodology can be quite complex. The point is not to develop some type of convoluted rating scheme that only a statistician will understand, but to develop a valid, objective method to rank vendors' responses based on specific needs.

It often is better to label a crucial feature as "essential" or "critical" rather than "mandatory." If a system cannot meet any feature labeled mandatory, it must be eliminated from consideration.

Some libraries include costs as part of the established evaluation. Another slightly different approach is to consider costs only after other aspects of the automated system have been evaluated. When reviewing costs, it is important to determine the entire cost of the automated system over a five-year period.

In addition to judging a system's features and reviewing the costs involved in installing the system, it is very important to evaluate vendor-related criteria such as the level of ongoing support offered and the vendor's policy on program upgrades. To help in evaluating

both the features of the vendor's system and the level of vendor support, be certain to contact several libraries that are currently using the vendor's system.

Summary

Lack of a coherent automation plan is one of the primary reasons why libraries often fail to implement a successful automated circulation system or online catalog. Maintaining open communications with all parties involved is critical in helping to ensure the success of the automation process. Working with staff to develop a list of what is needed from an automated system, and judging each vendor's system accordingly, will help ensure that the best automated system is chosen.

Chapter 4

Catalog Conversion and MARC Records

Cataloging information for each item in the library's collection must be converted to a computerized format before an automated circulation system or an online catalog can function. Cataloging data are converted from the traditional printed card format into either the national standard MARC (MACHine-Readable Cataloging) record format, or a non-standard (non-MARC) record format. The non-MARC record format is usually a format developed by the vendor of the circulation or online catalog software.

The process of catalog data conversion from a catalog or shelflist card to machine-readable format is commonly referred to as *retrospective conversion*, or "retrocon." The word "retrospective" simply means that the conversion of cataloging information is done for any titles already in the collection. (Generally there are catalog cards for these titles.) With the exception of outstanding acquisitions, this represents all the titles in a library's collection. "Prospective" conversion is the term sometimes applied to the ongoing process of converting the cataloging information for new acquisitions.

The decision to convert a shelflist to machine-readable form requires a major commitment in staff time and funds sufficient to cover all the conversion costs. Retrospective conversion is a very labor-intensive task that should not be undertaken without thorough planning. Insufficient funding and inadequate planning have seriously compromised the success of many conversion projects.

Note: The library's cataloging records form the foundation for the automated system. Lack of knowledge concerning the issues involved with retrospective conversion, MARC records and their use (or misuse) in automated systems, can cause major long-term problems.

Conversion to the MARC Format

MARC is an acronym for MACHine-Readable Cataloging. The MARC format was developed by the Library of Congress and a select group of libraries in the late 1960s. The term "machine" may appear somewhat antiquated but conversion to the MARC format was initially done on keypunch machines rather than using the current method of entering cataloging data at a computer keyboard.

MARC implements the American National Standards Institute standard for storing and communicating cataloging data in a computerized format on a magnetic tape (ANSI Z39.2). MARC is also recognized as a standard by the International Standards Organization (ISO). In the United States it is often referred to as USMARC to distinguish it from slightly different versions used in other countries such as UKMARC or CANMARC.

There should be no need to impress upon any librarian the importance of adhering to accepted standards. For larger libraries the importance of the MARC standard is not an issue. Almost all of these libraries use a MARC-based cataloging system, like OCLC, for their prospective and retrospective conversion. Larger libraries also select minicomputer automated systems that often will accept only MARC records. Unfortunately, when most microcomputer-based automated systems were developed they could not accept MARC records. Some vendors of micro-based systems either have developed, or are now developing, programs to allow their automated systems to accept and store MARC records.

There continues to be considerable discussion in small libraries about the importance of MARC records and their use in an automated library system. A common criticism voiced by librarians is that using MARC records in a microcomputer-based automated system is overkill because MARC records contain too much data that is not used by the system. But this is confusing the format of a cataloging record with its content. Simply because an automated system does not use all the cataloging data is not a valid reason to dismiss the

format in which the data is stored. Besides, cataloging data that is not currently in use may be beneficial in a future upgrade of the system. The content of a record, as noted in the next section, is more often a reflection of cataloging decisions rather than a result of using the MARC record format.

MARC, AACR2, and Quality Cataloging

There is a mutually supportive relationship between MARC and the Anglo-American Cataloging Rules, 2d ed. (AACR2). AACR2 serves as a guide on how to catalog an item and what cataloging data to include in the record. The MARC formats serve as a guide on where in the MARC record (i.e. what fields and subfields) to enter the cataloging data.

Many librarians have the misconception that adherence to the MARC format automatically guarantees a complete and accurate cataloging record. This is not necessarily true. It is possible to do poor or minimal cataloging in the MARC format. The actual quality of a cataloging record will depend on the cataloger's knowledge of both AACR2 and the MARC formats. Quality cataloging is also highly dependent on the commitment from the library to maintain high cataloging standards. Unfortunately, as budget reductions are made, some libraries reduce the resources used to maintain high quality cataloging. This will eventually have a negative impact on the online catalog. The most powerful and sophisticated searching options in an online catalog are of limited value if complete cataloging data are not available because of decisions made during cataloging or the retrospective conversion project. In other words, a patron cannot successfully search for cataloging data that are not there.

Conversion Options

There are three basic methods for doing retrocon: typing in the cataloging data at the keyboard (usually in a non-MARC format), using a procedure to match records for items in a collection that have already been converted by another library, and sending a shelflist to a conversion vendor who will produce machine-readable records.

Typing in the cataloging data at the keyboard: Virtually all automated systems allow brief cataloging data to be typed for each item in the collection. This process is very labor-intensive and seldom results in either a complete cataloging record or a record that is in the MARC format. *Except in unusual circumstances typing cataloging data is not recommended!* Until the mid-1980s this was the only viable conversion option for many small libraries. However, with the development of inexpensive conversion programs like MITINET/retro and Bibliofile, small libraries now have conversion options to give them a complete MARC record for most of the titles in their collections.

Using a program or method to match titles in a collection with the same titles that have already been converted by another library: For almost every item in a library's collection some other library, somewhere, has already converted the cataloging data for that item. Locating and using this converted record is the concept used with popular conversion systems like MITINET, Bibliofile, and OCLC. By having access to items that have already been converted the cataloging data does not need to be entered into the system. The cataloging records are already in the MARC format. Wisconsin libraries may also use MITINET, Bibliofile, or OCLC to add their holdings to WISCAT.

One of the major advantages of using one of the first two options is that the conversion is done within the library. Local control enables staff to establish quality control procedures, resolve problems, and monitor the project. Much of the work involved with most library-based conversion programs can be done by paraprofessionals, students, or competent volunteers. When doing conversion within the library, the staff has to purchase the

conversion program, appropriate hardware, and pay, either directly or indirectly, for access to the cataloging database.

Contract with a conversion vendor who will produce machine-readable records: This can be a viable option if a library does not have the personnel to conduct a conversion in the library. The cost per title can vary substantially. Some vendors charge less than 50¢ per title converted while others will charge more than twice this amount. Some vendors may be able to do the library's conversion at less cost than it can be done within the library.

Two primary concerns must be addressed when considering contracting out the conversion. The first concern is the accuracy and completeness of the library's shelflist. The shelflist cards that are sent to the vendor may lack sufficient cataloging information to accurately determine if a match is found. When the conversion is done in the library, staff can physically retrieve the title from the shelf to verify an edition statement, publication information, or other cataloging data missing from the shelflist card. Obviously, this verification process cannot be done when the conversion is done off-site.

The second concern regards the database that the vendor will use to attempt to find a cataloging record that matches each of the library's shelflist cards. Most conversion vendors use the Library of Congress (LC) MARC database as a source for matching titles. The match rate against the LC database will often be 80-90 percent or higher for most public libraries. However, the LC database does not contain many of the non-print items held in the typical school media center and may not contain a high percentage of items held in some special libraries. To augment the LC database some vendors also use cataloging records contributed by other libraries. Some of these contributed records are not of the same quality as the LC records.

Other issues related to contracting out the conversion include: what happens to titles from the collection that cannot be matched, who owns the converted records, and, in what format (MARC, non-MARC) and form (magnetic tape, floppy disk) are the records returned to the library?

What Problems Can Be Encountered During Retrospective Conversion?

Lack of complete and accurate information on the catalog or shelflist card is a common problem encountered in the actual conversion process. As noted in option three above, this problem is especially important if the conversion will be contracted to a vendor. To get the missing catalog information by checking the item on the shelf is very time-consuming and frustrating, but it is a necessary step to help ensure the quality of the conversion. The problem of inadequate cataloging exists regardless of the system or specific program used for the conversion.

Another problem sometimes encountered is the need to do a second complete or partial retrospective conversion. This problem often results from either inadequate planning or limitations in the original conversion. There are two specific reasons for having to conduct another conversion: 1) only brief cataloging data were entered as part of the original retrospective conversion, or 2) a non-MARC conversion was originally done. If only brief cataloging data were entered as part of the original conversion, in almost all instances the data are not in the MARC format. This situation is very prevalent in small libraries doing retrocon by typing the cataloging data at the keyboard as outlined in option one of the previous section.

Unfortunately, many small libraries are in danger of repeating the same conversion mistakes made by larger libraries ten years ago. That is, most of the early minicomputer-based circulation systems used a brief cataloging record that was often not in the MARC format. As the larger libraries upgraded their automated systems, including implementing an online catalog, they often confronted the unpleasant task of upgrading their brief non-

MARC records to full cataloging records. A very large majority of small libraries currently have micro-based circulation systems will confront the exact same problem in the 1990s as they attempt to find methods to upgrade their brief non-MARC records to more complete records. It can be difficult and costly to upgrade brief non-MARC records to include subject headings, notes, added authors, and other information for use in an online catalog. This can have important implications as online catalog programs become more sophisticated and allow users to search all the data in the MARC record. It is easier to start with a complete MARC record than to start with a brief record and upgrade later. Conducting an accurate and high quality conversion is essential to avoid many of the problems that later plague automated systems.

Because retrospective conversion is costly and time consuming, libraries are sometimes tempted to do a "quick and dirty" conversion. This type of conversion, however, will often be more costly and time-consuming in the long-term as staff conduct a continuous "clean-up" to correct errors committed during the initial conversion. The "slow and clean" method of doing retroconversion is definitely the better long-term strategy.

It is important to adhere to a standard format for storing cataloging records. Employing a system that uses the MARC format for converting a collection into machine-readable form will help guarantee that it will not have to be done again.

What Should Be Considered in a Retrospective Conversion Program?

There are many different retrospective conversion programs currently being marketed, including several programs that operate on microcomputers. Using a conversion program that supports MARC records will allow the staff to start the conversion process at anytime without even knowing which automated system will be used for circulation or the online catalog.

The program that is best will depend on the following:

- purpose of the conversion,
- funding available,
- knowledge and level of staff involved,
- hardware and supplies,
- size and type of the collection,
- size and type of database used for matching the collection,
- need to edit the bibliographic data or to add local data (e.g. call number), and
- options (if any) for converting new acquisitions.

The ideal retrospective conversion program will:

- provide a complete cataloging record in the Library of Congress MARC format.
- minimize the typing of cataloging data by matching titles in a collection with titles that have already been converted by another library.
- provide an easy method to enter cataloging data for titles that cannot be matched.
- provide numerous error checks to help ensure the accuracy of the conversion.
- provide a method to edit cataloging data and to enter the local call number and other local information.
- be very easy for paraprofessionals, volunteers, and students to use.
- be relatively inexpensive to purchase, operate, and maintain.
- not restrict the use (including copyright restrictions) of the converted records.

MARC: a comprehensive but complex format

The MARC format is a very comprehensive and detailed format. No non-MARC format is as thorough in its specificity. The MARC record uses fields and subfields to store bibliographic data. Most fields for entering cataloging data are identified by a three-digit number called a "tag" and the subfields are generally designated by letters. For example, the tag for the title field is numbered 245. The main title is entered in subfield \$a ("dollar sign a"), the subtitle in subfield \$b, and the statement of responsibility is entered in subfield \$c. There are hundreds of fields and subfields in the MARC format to allow for the most detailed cataloging of any item in the library's collection.

```
Leader:00745nam622001816a$4500
Direct:001001400000 005001700014 008004100031 020001500072
040001100087 100003000098 245011400128 260005500241
300002600296 500016700322 650001600489 700002800505
7100030005330
Tag I Text
001 CRLG82-B335090
005 19821119081042.00
008 821119s1982$$$mnu$$$$$$$$$00010$eng$d0
020 $$ $a09369961370
040 $$ $aCU$cCU0
100 10 $aBlixrud, Julia C.,*d1954-0
245 12 $aA manual of AACR2 examples tagged and coded using the MARC
format /*cby Julia C. Blixrud and Edward Swanson.0
260 06 $aLake Crystal, Minn. :$bSoldier Creek Press,$c1982.0
300 $$ $aiii, 116 p. ;$c28 cm.0
500 $$ $a"An adjunct to the series of manuals illustrating cataloging
using the Anglo-American cataloging rules, second edition,
prepared by the Minnesota AACR2 Trainers."0
650 60 $aCataloging.0
700 10 $aSwanson, Edward,*d1941-0
710 20 $aMinnesota AACR2 Trainers.0||
```

Figure 4.1 A MARC record.

There are separate MARC formats and specific fields and subfields defined for different types of items: the MARC format for maps has a field for the map's scale; the MARC format for serials has a field for the frequency of the serial. Some fields, like the title field, appear in all formats regardless of the type of item being cataloged. In addition to the bibliographic formats, there is a MARC format for authority records which establishes one form of an author's name, a series, or a subject heading. Another MARC format, recently developed for holdings data, includes the library name, call number, number of copies, and other local data. A MARC format for storing patron data for use in automated circulation systems is currently completing the formal standards process.

Virtually all commercially available mainframe and minicomputer automated library systems accept MARC records. Many of these systems also store MARC records and can output MARC records to magnetic tape. There are a number of reasons, some of which are

listed below, why the MARC format has not yet been adopted by all vendors of smaller microcomputer-based systems.

1. Most microcomputer systems were initially designed just as circulation systems that used very brief cataloging records and the complete cataloging often associated with MARC records was not necessary. However, micro-based online catalogs need a complete cataloging record to allow searching by subject headings, content notes, and other cataloging data.

2. Most smaller libraries traditionally lacked a non-technical and affordable conversion method to convert their titles into the MARC format. However, the development of MITINET and CD-ROM based conversion programs like Bibliofile has made a MARC conversion easier and more affordable for smaller libraries.

3. The MARC record itself is a complex format that can take a high degree of vendor and computer resources to implement and support. Some of these complexities are listed below.

- There are over a thousand fields and subfields for each MARC bibliographic format. Some of the fields, such as subject headings are repeatable, while others, like the main title, are not. A book may have five subject fields or it may have none. A vendor's automated system must accommodate all these variations.
- The MARC record is variable in length. Some records may be only 300 or 400 characters in length while others may be 3,000 to 4,000 characters long. (It is the actual AACR2 cataloging rules and completeness of the cataloging that determines a record's content and its length.) Most computer programs use records that always have the same, or a "fixed," length. The first generation of microcomputers also had very limited disk storage which discouraged the use of full cataloging records.
- The specific tag and its location in the record are not located with the corresponding data. Instead, a record directory at the beginning of each cataloging record contains data identifying the tag, the starting location of its data in the record, and the length of the tag's data. Most microcomputer vendors are not familiar with this method of data and record management.
- The MARC format originally stored and transferred data using reels of magnetic tape. Microcomputer vendors with neither tape drives nor experience in transferring data from tape to a floppy or hard disk will find it physically difficult to handle MARC records.
- The MARC record uses an "extended" ASCII character set for foreign language diacritics and other special characters. Most microcomputers have difficulty displaying or storing these characters unless the vendor has developed programs to accommodate these characters.

As microcomputers become more powerful and large capacity hard disk drives become less expensive, there is no reason, from a hardware perspective, to claim that microcomputer systems cannot support the MARC format. As vendors continue to enhance their library software to take advantage of improvements in hardware, librarians have to make certain that these enhancements include the ability to support the MARC format. While this is not an easy task, it can and has been done.

Any automated circulation system should be able to accept MARC records on input for loading into the automated system. The system should also be able to output (i.e. save to a floppy, hard disk, or tape) MARC records or at least MicroLIF records (see the MicroLIF section in this chapter). Many vendors claim their systems can "accept" MARC records. However, it is imperative to ask for the name of at least two libraries that use MARC records in the vendor's automated system and thoroughly understand the process the vendor uses to transfer the MARC records into the automated system. Ask if any data from current MARC records is not retained when it is transferred into the automated system. The use of MARC records in a local micro-based automated system is covered in more detail in chapter five.

The Conversion of a Library's Holdings Data

While the MARC formats for cataloging data have existed since the late 1960s, a MARC format for a library's holdings was not developed until the mid-1980s. Holdings data can include the name of the library, the local call number, collection code data (e.g. Ref., Juv., Fiction), and number of copies held. Many conversion vendors do not support the MARC holdings format. To allow local holdings data to be entered, most conversion vendors have developed their own local holdings fields and subfields that are included as part of the MARC cataloging record.

To successfully process local holdings data, vendors of circulation and online catalog programs must know exactly where (what fields and subfields) in the MARC record the local data are stored. Therefore, it is important to always enter holdings data consistently and to know all the options for using and manipulating local data in the automated system. If the circulation or catalog software vendor is not concerned about such details, they are not being totally candid or they do not fully understand the process of using MARC records. This is a critical step in the conversion process and the person ultimately responsible for the automated system must be concerned with such details!

The Conversion of New Acquisitions and MicroLIF Records

Until recently the only options for cataloging data for new acquisitions into an automated system in a timely fashion were to use a cataloging network, like OCLC, and select an automated system that has a direct online interface to the cataloging terminal, or enter new cataloging and copy level data at the keyboard. Both of these options are less than ideal. Most small libraries cannot afford OCLC. Entering cataloging information at the keyboard is very time consuming, either for retrospective conversion or prospective conversion of new acquisitions.

In the past several years, two more viable options have become popular alternatives for obtaining cataloging data for new acquisitions. These options include the CD-ROM-based conversion products and the development of the MicroLIF format.

Several vendors of microcomputer-based automated systems have developed interfaces to some of the CD-ROM-based conversion programs. These programs can be used for both retrospective conversion and for the conversion of new acquisitions. Most of the CD-ROM programs, such as Bibliofile from the Library Corporation, use the Library of Congress MARC database stored on CD-ROMs. The vendors of these conversion programs provide updates at least monthly. Small public libraries should be able to match 80 to 90 percent of their new print titles by searching the Library of Congress database on CD. The percentage matched for non-print titles and collections in other types of libraries will generally be lower. Be certain to ask whether an automated system also supports the MITINET/marc program for entering cataloging for items not found on the Library of Congress CD-ROM database. MITINET/marc, a program jointly developed by the Wisconsin Division for Library Services and Information Transform, Inc., enables staff to enter cataloging data in the MARC format without needing to know MARC terminology or the MARC record formats.

Another recent option for obtaining cataloging data for new acquisitions is to obtain cataloging records in the MicroLIF format from a book jobber. MicroLIF (Microcomputer Library Interchange Format) was developed in 1986. It better facilitates the storage and transfer of cataloging data using microcomputers. Specifically, MicroLIF allows libraries to get cataloging data for new titles on an Apple or IBM compatible floppy disk directly from a book jobber. (MARC is a standard originally developed for storing cataloging data on

magnetic tape.) MicroLIF uses most of the same tags and subfields as MARC records. The MicroLIF format also defines other specific fields including fields for barcode numbers, acquisitions data and disk format. While investigating vendors that have microcomputer-based automated systems, be certain to ask them if they support the MicroLIF format.

MicroLIF is designed to be convertible to MARC. MARC records can be converted to MicroLIF and MicroLIF records can be converted back to MARC with the use of special conversion software. Ask vendors if they have developed the software to do this conversion and if this software is available to the library. Also ask whether any data is lost in the conversion process.

If MicroLIF records are purchased from a book jobber be certain they contain complete bibliographic data including subject headings, added entries, content notes, and the MARC fixed field data. Some jobbers supply brief MicroLIF records which are acceptable for use in an automated circulation system but not in an online catalog. Also, ask whether the MicroLIF record was created from a Library of Congress MARC record. This helps to ensure a high-quality cataloging record. If titles are preprocessed, vendors can add a barcode to the physical item and include the number of the barcode in the MicroLIF record.

MicroLIF is not the same as MARC and is not a recognized standard. At this time it is being supported by some vendors of microcomputer-based library automation systems and several book jobbers. Advocates of the MARC format have criticized these two groups for "reinventing the wheel" by developing another cataloging record format. There is an effort by both the advocates of MARC and MicroLIF to reconcile the differences between the two formats. It appears likely that, by late 1991, MicroLIF will eventually cease to exist as a separate distinct format and some of the fields and data elements available in MicroLIF will be available in an expanded MARC format.

Summary

Conversion is an expensive and time-consuming process that is critically important for any library's long-range automation goals. Conversion builds the library's database which is the foundation for all other automation activity. Failure to provide a solid base can jeopardize any future automation efforts.

Collection conversion to the MARC format helps to insure compatibility with a recognized standard. It also helps to insure that the library will not have to conduct another conversion at some future date. It is in the best interests of an individual library and the library community for all vendors of automated systems to adhere to the MARC standard. The library community can help to ensure the acceptance of MARC records by selecting only vendors that can accept MARC records on input for loading into an automated system, and vendors that can output MARC records from their automated system.

Microcomputer-based Automated Systems

Chapter 5: Database Management and Maintenance

Chapter 6: Microcomputer Circulation Systems

Chapter 7: Microcomputer Online Catalogs

Chapter 8: Hardware and Related Issues

Chapter 9: Vendors of Microcomputer-based Automated Systems

Chapter 5

Database Management and Maintenance

After retrospective conversion is complete, many vendors of circulation systems and OPACs have programs that load the library's MARC records into the vendor's automated system. This process, often referred to as "loading," electronically transfers the cataloging data from floppy disk or magnetic tape to the hard disk in the microcomputer that the library will use for the automated system. The process of working with MARC records and loading them into a local automated system assumes that retrospective conversion is complete and that there are MARC records for all or almost all items in the collection. If the conversion was done by typing in all the cataloging data at the keyboard most of the information in the following two sections will not apply.

The entering, or loading, of cataloging data onto the microcomputer's hard disk and the ongoing maintenance of the data are functions of the database management system. The database management system, or DBMS, is a critical part of any automated system. The DBMS is the computer program or set of programs that manage and control files and indexes containing cataloging and other data necessary for the functioning of the automated system. The ability of staff to add, change, and delete data and records from the automated system is a function of the DBMS.

Some micro-based circulation systems have rudimentary database management systems. From the staff's perspective, the DBMS is just another facet of the circulation system. More sophisticated database management systems are necessary for maintaining the complete cataloging records and indexes used in an online catalog and to allow for complex searching in the OPAC. Vendors do not always write their own database management system but adapt a commercial system, like dBase, a program used for a variety of other purposes not related to library applications. From the librarian's perspective, the DBMS is often referred to as the cataloging or catalog maintenance program.

Loading the Cataloging Database

It is important to understand the options available for loading the data from a library's MARC records into the automated system. In larger minicomputer systems, a library's MARC records are loaded directly onto the automated system's disk drives from reel-to-reel magnetic tape using a reel-to-reel tape drive. If MARC records are on reel-to-reel magnetic tape, they will have to be transferred from the tape to floppy disks or a streaming (cartridge) tape before they can be loaded onto the microcomputer's hard disk. Some conversion programs, such as the Library Corporation's Bibliofile system, allow library staff to save MARC records directly to a floppy disk. The method used to transfer records depends upon the conversion program used and the automated system selected. Libraries that participate in WISCAT and plan to extract MARC records for use in an automated system should refer to Appendix D for more specific information on this process.

The following questions address the issue of transferring records and loading the library's database:

What is the process used to get the library's MARC records into the automated system?

- The library loads records from floppy disks. If the library has MARC records on magnetic tape, will the conversion vendor, the automated system vendor, or a vendor specializing in MARC records processing convert the MARC data from tape to MARC or MicroLIF records on floppy disks for loading into the automated system?
- The library's vendor loads records onto the hard disk.

- The library loads records directly from a MARC database (OCLC, Bibliofile, etc.).
- The library or vendor loads records by a tape load (reel-to-reel or streaming tape). Will the library have to purchase a tape drive?
- Other, ask the vendor to explain.

How much will it cost to load the library's records into the automated system if it is done by the vendor?

- Is there a flat fee?
- Is there a cost per record?

What conversion systems or vendors are currently supported?

- MITINET/retro (Brodart)
- MITINET/marc
- Bibliofile
- OCLC
- SuperCat
- other vendors or sources (e.g. book jobber)?

Can records in all MARC formats be loaded (monographs, serials, A-V, etc.)?

Are all appropriate indexes created at the time the records are loaded onto the hard disk? Indexes are created from cataloging and other data to make it easier for the automated system software to search for records and other data. See chapter seven for more information on indexing.

How are duplicate records determined and, when duplicate records occur, which one is loaded into the automated system? For a variety of reasons related to the conversion program used, the method of updating records (before they are loaded into the automated system), and the library's conversion procedures, more than one cataloging record may exist for the same title. Resolving this problem is usually a responsibility of the automation vendor or a third-party vendor that specializes in "cleaning-up" the library's records. Most vendors have options that determine which duplicate record is actually loaded into the automated system. Make sure that the correct record is loaded.

Can the library define what data (specific field/subfields) are to be downloaded from the MARC/MicroLIF record?

- Does the vendor have a cataloging record profiling form for the library to complete designating what data should be taken from the MARC records and loaded into the automated system?
- Can all the data from a complete MARC record including all fixed field data be loaded? If not, what are the limitations in the number and length of fields and subfields? Many micro-based systems do not use all the data in a MARC record. Therefore, it is important to learn how the system determines what data will be retained. The type and amount of data will be dependent on the comprehensiveness of the vendor's program and also on the decision to implement a circulation system, online catalog, or both. As previously noted, it can be difficult and costly to upgrade brief circulation records to more complete cataloging records for use in an online catalog. See the "Database record structure" section in this chapter for more specific information on the amount of cataloging data retained in the local system.

Can the automated system store local data (e.g. the library's local call number) that was entered by the library during its conversion (assuming the library notifies the vendor which fields and subfields were used for local data entry)?

Can the system automatically create item level records for a circulation system if copy data is in the library's MARC records? If the number of copies held for each item was entered during retrocon, some vendors can use that copy-level data to create circulation records for each copy in the collection. This can save staff time by eliminating some data entry or "clean-up" work once the database is loaded into the vendor's circulation system. Again, library staff need to be aware of available options and vendors have to know where (what fields and subfields) the copy level data was entered.

What options does the library have for entering cataloging data for new acquisitions or newly converted items once the library's MARC records are loaded into the automated system? Some vendors have developed interfaces that allow book jobbers to supply a library with MARC or MicroLIF records for the library's new acquisitions. These data are then loaded into the automated system, thus avoiding the necessity to enter cataloging data for new acquisitions at the keyboard. It is important to understand

- what the exact process is for loading new acquisitions into the automated system.
- what systems or book jobbers offer MARC or MicroLIF records for new acquisitions.
- how local data including call number and barcode will be entered into the system.

Can cataloging data be entered in the MARC format for new acquisitions using the program used for retrocon? What programs/vendors are supported?

- MITINET/marc
- Bibliofile
- other program

If the library is an OCLC member, does the vendor have a direct interface for downloading OCLC records into the automated system?

Will staff have to enter cataloging data for new acquisitions using the program supplied by the vendor of the automated system? If so,

- does the program provide a work form or on-screen prompts for keying in cataloging and other data?
 - does the work form or prompts use English-readable terminology?
 - can staff edit the work form to add or delete fields and subfields?
- can staff enter cataloging data at the keyboard in the MARC format? Most data entry programs that are part of a vendor's automated system do not use the MARC format.
- does library staff have to know the MARC format when manually entering cataloging data?
- does the system automatically provide for ISBD (International Standard Bibliographic Description) punctuation?
- what checks, if any, does the data entry program do to help ensure the integrity and quality of the data that is entered?

Database Record Structure

Almost all microcomputer systems do not actually store cataloging data for each item in the MARC format. The storage form for records is not as critical as the form in which records can be output from the vendor's database management program. That is, the record should be retrievable from the automated system after being changed into the vendor's internal format. Most microcomputer systems cannot generate a MARC record on output to a floppy disk. If the staff wants to change vendors they may have to use the original MARC records, which may not contain newer acquisitions or other cataloging or holdings changes. Or a conversion vendor may have to convert existing non-MARC data back into a "MARC-

like" format or another format that a new vendor can use. This process can be expensive and the results less than satisfactory.

The decision to implement a circulation system before the OPAC can have a major impact on how much cataloging data is stored with each record. Many vendors' circulation systems store only a partial cataloging record. A separate record is stored on the hard disk for each copy (volume) in the library. More sophisticated microcomputer systems will support a complete—or almost complete— cataloging record for each unique title in the library's collection. Separate "item" records containing brief data for each copy are then electronically linked to the unique title record. This method is used in most of the larger minicomputer automated systems. The following questions address the issue of the database record formats.

Is there one master cataloging record for each unique title with item records for each copy linked to it for circulation? A cataloging record assumes the system can support a complete or almost complete cataloging record. Item records are the brief records used in a circulation system. If the library plans to implement a circulation system only it may not have the capacity to support a full cataloging record. Also, although a system may be able to load MARC records this does not imply that all the cataloging data from the MARC record is stored in the system.

- What is the format of the cataloging record?
 - MARC (including leader, fixed fields and record directory)
 - MicroLIF
 - vendor defined
 - other

If a complete cataloging record is not supported, what are the limits for

- the maximum number of characters per cataloging record?
- the maximum number of fields per cataloging record?
- the maximum number of subfields per field?
- the maximum number of characters in each field and subfield?
- any fixed field data?

What is the maximum number of item records that can be linked to each master cataloging record?

Does the system store only brief data for each copy of an item without storing a complete master record that contains the full cataloging data? If so,

- what is the maximum number of item records supported by the system?
- what is the maximum number of characters per item record?
- what is the maximum number of fields per item record?
- what is the maximum number of characters in each field?

In what record format does the automated system output cataloging records?

- MARC (including leader, fixed fields and record directory)
- MicroLIF
- vendor defined
- other
- no record output

If the system cannot output cataloging records in some format, consider another vendor's system.

On what physical medium (tape or floppy) does the automated system output cataloging records?

Database Maintenance

Once the data from each cataloging record are loaded into the automated system, the staff must be able to efficiently edit that data. This includes the ability to add, change, and delete data within a cataloging record and to add and delete an entire cataloging and item-level record. Unfortunately, staff seldom spend sufficient time evaluating the database maintenance features of a vendor's automated system. Other programs, like the circulation system or the OPAC, often receive more attention because they are more visible. Yet poorly designed and cumbersome maintenance procedures can cause endless frustration. They can also have a negative impact on maintaining data quality which will ultimately be reflected in the circulation system and the online catalog. The following questions address the issue of database maintenance.

Was the database management system developed by the vendor or adapted from a program commercially available from another vendor?

Is the database management system primarily command-driven, menu-driven, or does it use both commands and menus? In brief, with a command-driven system, a user types what specific function or option he or she wants at the keyboard. In a menu-driven system, the user selects the function or option from a list on the screen.

- Can staff who are familiar with the system bypass the menus to speed entry?
- Do screens have prompts to guide users?
- Does the DBMS have context-sensitive help messages?

What type of error checking or validation, if any, is done after an item is entered?

- Is an error message or alert given if staff attempt to enter a field, subfield, or indicator that has not been previously defined?
- Does the DBMS check for cataloging records with duplicate call numbers?
- Does the DBMS check for cataloging records with duplicate LC card numbers or duplicate ISBNs?
- Does the system warn staff when it detects what it assumes to be a duplicate record?

To what extent can cataloging records be edited (data added, changed, and deleted)?

- Can data be edited at both the field and subfield level without having to re-enter all the data in a field or subfield?
- Can a modified record be saved as one process or does each line or field have to be saved separately?
- Does the system support record locking or field locking to prevent others from editing the same data at the same time? (This assumes more than one microcomputer is on a network.)
- Is the ability to change all occurrences of a word or phrase in all records with a single command (global editing) supported?
- Can editing be done when the system is in regular operation (i.e., while items are being circulated, this assumes a system with more than one microcomputer) or only when regular functions are not operational?
- Can records be edited when the system is in normal operation and kept in a temporary file to be added later in a batch mode when regular functions are not operational?

Can fields be defined by the library for entry of local cataloging data?

Can a title or individual item record be declared lost without removing it from the database?

Does the system issue a warning if a record to be deleted has outstanding loans against it?

Can all associated indexes be updated while the system is in normal operation (i.e. items are being circulated) or only when regular functions are not operational? What effect will this have on response time?

Does the system have any authority control functions? Authority control is the ability to standardize one form of a name or subject heading with appropriate cross references to variant forms or related forms. Authority control, while not necessary for a circulation system, is especially helpful in online catalogs. Most microcomputer-based online catalogs do not have sophisticated authority control procedures. Some of them have no authority control at all.

If the vendor does not offer any authority control capability, another vendor can match the names and subjects in a database against the Library of Congress Name and Subject Authority control records (if the records are in the MARC format). This must be done *before* the database is loaded for use in the online catalog. This option will not reconcile all authority-related problems or create any cross references. However, it will establish a standard single name form for many popular authors and reconcile differences in many common subject headings.

- Is the MARC format for authority records supported?
- Are authority records actually stored as separate records in the automated system and electronically linked to each occurrence of those headings in the database?
- What fields in the MARC cataloging record are subject to authority control?
- Are separate authority files maintained for name and subject terms/headings?
- As new items are added to the database, does the program automatically check terms or headings in the fields which are subject to authority control? Does the system alert the staff to unrecognized terms or headings?
- Can local authority headings be created? Is a workform provided for this?
- Can an authority control record be easily added, edited, or deleted by library staff?
- Does the system alert staff if they try to delete a term or heading that still is used in the database?
- Does the system automatically create and maintain cross references? Are cross references automatically deblinded? The process of "deblinding" cross references prevents a "see" or "see also" reference to a heading that is not used.
- Can staff browse the authority control file to review the terms or headings used?
- Can the authority file be saved to a tape or floppy disk?
- Can statistics be generated on the terms or headings used in the authority file?

Does the system support the complete ALA character set? Many micro systems do not support the ALA character set which includes special characters for foreign language diacritics. If the collection will be converted into the MARC format, be sure to understand how the vendor's software will manage these characters, which may be present in the MARC records. Unless the vendor's program is specifically designed to deal with these characters, indexing and filing errors may occur. Errors of this type can affect the retrieval of information in an online catalog and the appearance of data on the screen.

- How are the characters that are not supported (e.g. foreign language diacritics) indexed?
- What do characters that are not supported look like on the screen?

Can spine and pocket labels be printed when new cataloging records are added to the system?

Is a card-catalog print program available?

What type of searching can be done?

Can the system provide for a variety of reports including

- total number of records in the system?
- total number of items?
- number of titles cataloged during a given period?
- number of titles edited during a given period?
- number of titles deleted during a given period?
- number of titles by type (A-V, print, maps, etc.)?
- number of titles in various call number ranges?

Does the system operate on a local area network (LAN)?

What type of security does the system have? How many levels of security are provided?

What are the options for system backup?

- streaming tape
- floppy
- Does the DBMS include a backup option or does the library have to purchase a commercially available back-up software program?

Is it possible to backup only selected files?

Summary

The database management system is an integral and critical part of any automated library system. A poorly designed or too simply constructed DBMS can substantially increase the work to maintain the quality and integrity of the library's database. Unfortunately, because its function is not always evident compared to the more visible circulation or online catalog software, the database management system seldom receives the critical review that it warrants when librarians are evaluating automated systems.

Chapter 6

Microcomputer Circulation Systems

Librarians automate their circulation because it is their most labor-intensive function. In a manual circulation system, the circulation of a single item involves many processes. If an item is overdue or on reserve, even more procedures are required. An automated circulation system can eliminate much of the staff time involved in circulating items by making the entire circulation process faster, more efficient, and more accurate. Although each vendor's automated circulation system varies in sophistication and operation, all systems have the ability to automatically charge and discharge items, determine their status, and produce circulation reports and lists. Better collection management can be attained by using the circulation statistics generated by the system as a collection development tool.

Most automated circulation systems provide these basic benefits. They can

- efficiently charge items out and charge them back in.
- replace paper circulation files.
- quickly determine status of items (charged out, overdue, on reserve, etc.).
- automatically calculate fines and record their payment.
- print overdue notices.
- determine eligibility of patrons to borrow materials and quickly identify patrons with items overdue, lost, etc.
- place reserves (holds) on items.
- provide statistical reports on collection usage for enhancing services and improving collection management.
- allow fast and accurate collection inventory.

Most manual circulation systems cannot easily provide many or any of the above benefits. With some manual systems it is virtually impossible to answer the common patron question, "What books have I checked out?" However, the benefits of automated circulation systems often differ substantially from library to library.

Background Information

For a variety of reasons, almost all current automated systems started as circulation systems. This includes systems initially developed for both minicomputers and microcomputers. Circulation is a very labor-intensive operation, and from the staff's perspective, it is often their first priority for automating. The circulation process is well understood (this does not imply it is simple) and lends itself to computerization. Circulation systems need only a brief cataloging record. Some vendors of microcomputer-based systems still have only a basic circulation system without an online catalog or other software modules such as automated acquisitions or serials control.

For several decades before the introduction of microcomputers, libraries used automation to assist them in controlling circulation. These early systems, used primarily in large academic libraries, used keypunch cards to record circulation transaction data. The systems, often called "batched" circulation systems, processed the punch cards together (batched) offline to sort items by due date, report items overdue, and record similar circulation data. Most of these systems were developed locally by university or municipal data processing departments. By the 1970s, circulation systems directly recorded the circulation transaction data by computer at check-out. These programs operated on minicomputers or even larger mainframe computers.

The first microcomputer circulation systems appeared in the late 1970s. Many of these early systems, often programmed by teachers or students, were "absence" systems because the circulation system only tracked items absent from the collection. When a patron brought an item to the circulation desk, a staff member entered brief cataloging data for the item at the keyboard. There was no database containing cataloging data for every title in the library's collection. Absence systems developed because they were easy to program and could be used with the limited memory (both RAM and floppy disk) available in the first microcomputers. There was also no need to do retrospective conversion before the system became operational. While absence systems worked reasonably well for libraries with low circulation, they were not practical for many larger libraries. Because of their many limitations a commercial market has not developed for absence-based systems.

By the early 1980s software companies began to design and market microcomputer-based circulation systems that actually stored a cataloging record for each item that circulated in the library's collection. Staff or students usually typed brief cataloging data for each item and stored the data on floppy disks. These systems, written by individuals working in school libraries, usually operated on the Apple II and II + microcomputers prevalent in many schools. The systems utilized barcodes and barwands for charging items in and out. The early circulation systems had limited record size for both items and patrons, and limited options for establishing loan periods, fines, and similar procedures. The programs usually required extensive "floppy shuffles" to print overdue notices, bibliographies, and reports on collection usage. The developers of several of these programs eventually marketed them or used commercial vendors to sell them to other schools and libraries.

The IBM PC, introduced in 1981, was a much more powerful machine than the various models of the Apple II. This power increased substantially with the introduction, several years later, of the IBM AT and with the more advanced models of the PS/2 series in 1987. The IBM PC and PC compatibles encouraged development of more sophisticated and comprehensive programs for library circulation. Many vendors who previously developed circulation programs for the Apple II reallocated most of their time and money to develop programs for the PC. Currently, there are very few circulation programs still marketed for use on an Apple II. Several vendors have recently developed circulation programs for the Apple Macintosh. However, these programs currently lack the variety of options available in most PC-based circulation systems.

Much of the library literature focuses on larger circulation systems that operate on minicomputer and mainframe computers. However, there are now more than 8,000 microcomputer-based circulation systems in operation throughout the country. This is considerably more than the estimated 3,500 libraries in the country that have or share a minicomputer or mainframe circulation system. The majority of the micro-based systems are in school and special libraries. The majority of the larger systems are in public and academic libraries.

How an Automated Circulation System Works

For an automated circulation system to function, there must be at least two types of data files stored on a floppy or hard disk: cataloging data and circulation information for each circulating item in a library's collection and patron data for each of the library's patrons.

In almost all minicomputer circulation systems one master cataloging record contains all cataloging data for each unique title. Attached to the master record are item-level records. If a library has four copies of a title, there will be four item-level records electronically attached or "linked" to the title's single master cataloging record. Item-level records contain brief cataloging data and other information specifically related to circulation, including a barcode number and the loan period. Item records usually do not contain subject headings, added authors, notes, and other cataloging information. This data is stored with the master record. Some of the more sophisticated microcomputer-based circulation systems also have separate master records for each title with linked item-level records. However, there are

micro-based systems that store only item-level records. These are typically about 80 to 120 characters long. There is no separate master containing complete cataloging information. While brief item-level records are acceptable in a circulation system, a complete cataloging record is essential to the functioning of an online catalog.

In addition to storing cataloging information, an automated circulation system must have basic information on the circulation policies for each item. This information includes due dates for each item, fines, renewals, and other circulation related details. These data are stored with the item level record.

The circulation systems currently marketed are "parameter" or "table driven." The staff can select from a variety of options to customize the circulation software to accommodate their library's different circulation policies for different items. This customization procedure is often referred to as "profiling" the circulation system. Vendors have built this flexibility into their circulation software so they can meet the variety of circulation requirements demanded by different libraries. Microcomputer-based circulation programs are often not as flexible as minicomputer-based systems and cannot accommodate every library's local circulation practices. A principal responsibility of the library staff is to make certain the selected micro-based system is flexible enough to be tailored to the library's circulation needs.

A file of patron data is an integral part of the circulation system. Basic patron information including name, address, patron category, and the patron's barcode number must be entered into the microcomputer. With most circulation systems, staff must type in the data for each patron. Some vendors are able to load patron data that is already in machine-readable form. For example, schools often have records for each student already in some type of computer file. The circulation vendor will usually charge a fee to transfer these records into the circulation system, but this may be less expensive than typing all the patron data into the system. Some circulation systems designed for schools also include administrative software for tracking attendance, class scheduling, and maintaining student records. These programs use the student's data in the circulation system.

All circulation systems will use barcodes. Barcoding is the process of attaching a unique label to each item that circulates and linking the number, or code, on the label to the specific item in the library's database. Each patron also has a unique barcode affixed to his/her library card that is linked to their record in circulation system's patron file. Barcodes are vital to the operation of the circulation system. They serve not only to identify specific items and patrons, but also to link patrons electronically with the items they have charged out, have on reserve, have overdue, and similar circulation activities. Barcoding is very labor-intensive second only to retrospective conversion. If a vendor converts the shelflist it should also add a barcode number as part of the conversion process. The vendor will also supply the barcodes printed in shelflist order.

In use since the 1950s, there are more than 30 different types of barcodes. One of the most common is the Uniform Product Code (UPC) on items purchased in grocery and retail stores. Several different types of barcodes are currently used by automated circulation systems. The most common standards are Code 3 of 9 (often called Code 39) and Codebar. The barcode used in a circulation system depends on the vendor. Some vendors support both barcode standards but others support only one code. Some may use a less common barcode or develop their own barcode which is not compatible with any other. With microcomputer-based systems, it can be risky to barcode a collection before selecting a circulation system because this narrows the choice of vendors. Be certain to ask vendors which barcode(s) they support and what they recommend for barcoding options.

Most libraries prefer to have all cataloging and patron data converted to machine-readable form starting before starting to use the automated system. In the past, many libraries with micro-based circulation systems applied the barcode to each item while doing their conversion. They physically moved each item to the microcomputer, typed in brief cataloging data, applied a barcode to the item, and reshelved it. Catalog conversion using

this method is not currently recommended because it implies that only a brief, non-MARC, record will be entered.

If conversion is complete and the cataloging data is in the MARC format, select a vendor who can load all or parts of each MARC record onto the microcomputer's hard disk. Then, using the circulation program's search options, a staff person can search the database for the item in hand. When the cataloging record appears on the screen, a staff member places the barcode on the item, electronically scans it with the bar wand, and reshelves the item. This method is often called using "dumb" barcodes because the barcodes have no relation to any item until physically placed on the item and scanned. Using dumb barcodes usually means that the items must be brought to the microcomputer. A variation is to use double barcodes. That is, there are two identical barcodes—one to place on the item on the shelf and another to place on the item's shelf list card. A staff person matches the barcode on the card with the item in the database, thus eliminating the need to reshelve the entire collection.

A variation to the above method is to convert item-level data "on the fly." As patrons bring items to the circulation desk to charge them out, staff search the database, locate the cataloging record, scan the barcode, affix it to the item, and record any other copy-level data. Sometimes patron data has already been converted, or it may be also entered at this time. Obviously, this method works best for libraries with a low circulation volume.

Another option when using MARC records is to have "smart" barcode labels produced. With smart labels, data from the cataloging record prints labels that usually include each item's title, author, and call number. The labels are printed on sheets in shelflist order. Staff can then go to the shelves and place the barcodes on the items without having to take each item to the microcomputer. Regardless of how accurate and complete the staff thinks the conversion was, when using smart barcodes they will still find items on the shelf without a corresponding record in the database and records in the database but no item on the shelf. The use of smart barcodes works best in school libraries or other libraries that have periods, at least in theory, when all items are on the shelves. Smart barcodes often are produced as part of the process of preparing the library's data to be loaded onto the hard disk. Sometimes this data preparation and barcode production is done by the circulation vendor but the vendor may subcontract this task to another vendor who specializes in this type of work. Not all microcomputer-based vendors offer the smart barcode option or work with other vendors who do.

Barcode placement is a local option. Most research has shown that patrons, including students, will not remove the barcodes if they are placed outside the item. Placing the barcode on the back of a book near its binding can make an automated inventory faster because the item will not have to be completely removed from the shelf.

The cost of barcodes for items varies from about .025¢ to 5¢ per barcode. Some factors that affect the cost of barcodes include the quantity ordered, whether they are covered with a plastic laminate, whether they have the library name or other information printed on them, and whether smart barcodes or dumb barcodes are used. Some circulation programs allow libraries to print their own barcodes, but should only consider this if the collection contains fewer than five thousand items.

Once all cataloging and patron data have been entered, appropriate barcodes applied, and various circulation options selected, staff can begin using the automated circulation system. To charge out items a staff member uses a light pen or similar device to read the patron's barcode and the barcode for each item being charged out. The circulation software then electronically links the patron record with the item record. It is not necessary to fully understand how this is technically done. The circulation software completes many other steps before an item is successfully charged out; for example, the system checks to make certain the patron's card is valid and that he or she has no items overdue or outstanding fines. In addition, the system must determine the due date for each item by checking the loan period in the item record. Other information will also be verified and statistical data updated to reflect the number of times the item has been charged out and the number of times the patron has charged items out. It is not unusual for sophisticated circulation

systems to complete 10-15 different verifications or file updates for every item charged out. Under normal circumstances the automated system will complete this process in less than two seconds.

When an item is returned, a staff member sets the circulation system into a "return" mode usually by selecting this option from a menu on the screen. Again, as in the charge out procedure, a light pen is used to read the item's barcode. The circulation software then "unlinks" the connection between the item and the patron. The software determines if the item is overdue or if it has been placed on reserve, and various statistical files are updated.

The number of microcomputers needed for circulation depends on the amount of circulation and the number of circulation points in the library. Generally, the library should have one circulation microcomputer per 60,000 to 80,000 annual circulations. If the library has multiple circulation stations—for example, separate adult and children's areas—then it will need at least two microcomputers regardless of the circulation volume. Be aware that some micro-based circulation systems only support the use of one microcomputer.

Questions on Library Circulation Policy and Procedures

The questions listed below must be answered by library staff to clarify some of the major circulation issues, policies, and procedures used in their library. It is important that the automated circulation system be able to accommodate both current and future circulation volume, policies, and procedures.

1. What percentage of the collection has been converted into MARC?
 - What system was used?
 - What local data (call number, copies held, etc.) were entered and where in the MARC record were they entered?
2. What is the number of unique titles in this library and how many titles does the staff anticipate having in five years?
3. What is the number of total copies (volumes) in this library and how many copies are anticipated in five years?
4. How many total items circulated during the most recent 12 months and how many items are anticipated to make up the annual circulation in five years?
5. What is the maximum number of titles circulated in one hour? In one day?
6. How many circulation stations (physical areas) are in the library?
7. How many different collection types are there (adult, fiction, juvenile, oversize, videocassettes, etc.)?
 - What are the loan periods for each collection type?
 - What are the renewal policies for each collection?
 - What are the fines for each collection type?
8. Are fines based on type of item or type of patron?
9. How many items are on hold or reserve at any given time? What is the maximum number of holds per item?
10. How many patrons are there currently and how many are anticipated in five years?
11. How many patron types are there?
12. Are some patrons prohibited from charging out some items (e.g. juveniles cannot charge out videocassettes)?
13. How often are patron cards renewed?
14. What types of circulation reports and statistics are kept?
15. What types of circulation reports and statistics would the staff like to keep?

Questions on Automated Circulation Systems

The questions listed below are designed for library staff to ask vendors of automated circulation systems. Staff should review the questions and select those that are most important to their library. Not every question listed will be relevant to every library. There may also be other concerns that are important to a library that are not listed. Information on how cataloging and item records are stored in the automated system and similar information related to database issues is covered in chapter five.

All the items below that are preceded by ellipses should be prefaced with the phrase, "Does the automated circulation system."

1. General Circulation Functions

Does the automated circulation system

... come with a complete set of documentation outlining the options staff can select for all circulation functions? Is a printed profiling form available detailing all the options that can be selected for basic circulation functions?

... allow quick changing from one function to another (e.g. from charge to discharge) via a menu? Is there an "expert" mode that uses commands to change from one function to another? How many steps or processes are needed to change from one function to another and how much time does it take?

... allow more than one circulation station (i.e. additional microcomputers) to be operational at the same time? How can they operate simultaneously?

- via a serial connection
- via a local area network (LAN)
- via a multiuser operating system
- other

... have to be placed a minimal distance from any book detection system?

... have some type of semi-automated backup system (for example, a floppy-based system or a portable device for storing item and patron barcodes) when the main circulation system is not functioning? Can data from the backup system be loaded into the main circulation system and update the appropriate files when the main system becomes operational?

... provide password or some other type of security to insure integrity of the system and the privacy of patron records and circulation data? How many levels are provided?

... allow the number of collection types to be defined by staff?

- How many different collection types does the system allow?
- Can collection types be determined automatically as records are loaded into the system (based on type of item defined in the MARC record)?
- Can different locations be designated for different copies of the same item?

... allow staff to declare an item missing without removing it from the database?

...allow cataloging, copy-specific, and patron data to be entered, changed and deleted? (See Chapter 5 for more information.)

- Can this be done while the circulation system is in operation? (This implies the use of more than one microcomputer.)
- Can any editing be done at the field or subfield level without having to reenter all data in that field or subfield?

...immediately update all files as transactions are made?

2. Basic Charge, Discharge, and Renewal Functions

Does the automated circulation system

...allow charging and discharging of items using barcodes and optical reading devices?

- What barcodes are supported?
- Does the vendor provide barcodes?
- Can the vendor provide "smart" barcode labels from a library's MARC records? Some vendors have programs to read copy level data from the library's MARC records to create custom barcode labels that include the call number and part of the author and title. These labels are printed in shelflist order and can be applied directly to items while they are on the shelves.
- Can barcodes have a unique library identifier?
- Does the barcode have a check digit to help prevent misreadings?
- Can the library print its own barcode labels?
- What optical devices are supported (light pens, scanners, laser readers, etc.)?

...indicate the acceptance of the item's barcode and patron's barcode by an audible beep and a screen message?

...allow items to be charged out or in by manually entering the barcode number and the patron number or by entering cataloging and patron data at the keyboard?

...allow only one reading of a patron's barcode even if the patron has more than one item to charge out?

...alert staff when a patron's card has been read but no items have been charged out after 30 seconds?

...automatically print a date due slip for each item? What information appears on the slip?

...display the due date and status of the item on the screen?

...allow staff to set a maximum number of loans to a patron?

- Can the maximum be automatically determined by patron type?
- Can the maximum be automatically determined by collection type?
- Can staff override the maximum?

...check the patron's status when as an item is charged out and alerts staff if the patron

- has items overdue?
- owes fines?

- already has the allowable maximum number of items charged out?
- is not allowed to charge out a specific type of item?
- uses a card that has expired or was previously declared lost or stolen?

... allow staff to override any of the patron alerts and still allow the patron to charge items out?

... allow staff to determine quickly how many items a patron has out?

... Check the item's status when it is being charged out and alerts staff if the item

- has not been charged in?
- does not circulate?
- is on reserve?
- is not in the database?
- was declared missing or lost?

... allow the number of loan periods and the length of each period to be defined by staff?

- Can different loan periods be defined for each collection?
- Can a default loan period(s) be determined automatically based on collection type (from the MARC record or from a collection type entered during conversion)?
- Can staff override the default loan period?
- Can a loan period be set for less than one day?
- Can staff set up a calendar so that loan periods automatically adjust for holidays and other days the library is not open, and is there a limit on the number of holidays? (Each day the library is not open is counted either as a Saturday/Sunday or as a holiday.)

... allow items to be renewed or not renewed based on patron type or collection type?

- Can the renewal or nonrenewal of items be determined automatically based on collection type (from the MARC record or from a collection type entered during conversion)?
- Can renewal loan periods be set at less than the original loan period?
- Can staff override a nonrenewal alert?

... allow items to be renewed when the item is not in hand (via phone)?

... alert staff when an item being renewed has a hold on it?

... allow staff to quickly determine if a specific item is charged out and when it is due back?

... charge out and charge in items in a maximum of two seconds during normal work load and a maximum of four seconds during peak use (for example, during the heaviest circulation period and when all microcomputers for an online catalog are also being used)?

3. Holds / Reserves

Does the automated circulation system

... alert staff when an item is charged in that it has a hold(s) on it?

- ... alert staff when an item is charged out that it has a hold(s) on it?
- ... allow holds to be placed at the title level and also on a specific copy of a title?
This can be done more easily if there is a single master record per unique title with copy level records attached to it.
- ... allow holds to be placed only on specific collections?
- ... allow staff members to set maximum number of holds per item?
- ... record the date a hold was placed?
- ... allow staff members to quickly review all holds and change the hold queue?
- ... allow staff members to delete specific holds or all holds on an item?
- ... automatically cancel a hold after a date specified by the patron and/or staff?
- ... print a list of all titles on hold with the number of holds per title?
- ... print a hold slip for items as they are charged in or upon staff requests?

4. Fines and Overdues

Does the automated circulation system

... notify staff members by a beep and screen message if an item being charged in is overdue? Can the fine and other data be immediately displayed on the screen and a printed notice produced? As items are being charged out, how easy and fast is it to charge in an item and determine the fine? This is especially important when using a single microcomputer for circulation.

... update the patron and item records when an item is overdue to indicate that the item is overdue?

... calculate any fines or fees based on the loan period and/or the patron type?

... allow different fines for each different collection?

... allow different fines for each different patron type?

... allow staff members to determine if a fine should be calculated based on the type of collection or type of patron? Can specific collections or patrons be exempt from fines or fees?

... calculate any fines or fees a patron has for overdue or lost items?

- calculates fine or fee per item?
- calculates total amount owed?

... allow a patron to pay only part of a fine and calculate the remainder? Can a partial payment be credited against specific items?

... clear the patron record when a fine is paid but retains data for statistical purposes?

... allow for a grace period?

- Can the grace period be defined by type of collection?
- Can the grace period be defined by type of patron?

... calculate any service or handling fee based on library policy?

... allow staff to review a patron's outstanding fines?

... allow staff to cancel a patron's outstanding fines?

... provide a report of all items charged out to a particular patron(s) with their due dates and any fines for overdue items?

... print overdue notices in

- real mode (e.g. while the system is in regular operation) and
- in batch mode (while the system is not in regular operation)?

... print overdue notices that include

- patron data (name, address, etc.)?
- prints above data so it can be placed in a window envelope and used as a mailing address?
- prints above data in "data mailers" (this eliminates the need to stuff envelopes)?
- title, author and call number of each overdue item?
- date item was charged out and date each item was due
- list of fines for each item overdue?
- total amount due including any service or handling fee?
- notice that patron privileges will be blocked?
- the ability of the staff to determine the language used on the notice?

... provide for automatic generation of at least three overdue notices to be printed at dates either specified by the staff or based on material type?

... print a lost item notice to the patron that includes the same information as an overdue item plus a lost fee assessment?

... allow overdue notices to be printed while the system is in regular operation (while items are being charge out or charged in)?

... print a report of all overdue items by title, author, and call number?

... print a report of all patrons who have their borrowing privileges blocked or have been declared delinquent?

... print a report of all items declared missing?

... provide for assessing fees for lost or damaged items?

5. Patron Data

Does the automated circulation system

... allow at least ten different patron types?

... allow the library to include the following data in the patron record:

- barcode number?
- full name, sex, date of birth, primary address, secondary address, telephone number(s)?
- borrowing restrictions?
- date registered and expiration of registration?
- local note?
- political subdivision (ward, city, township, county, school district, etc.)?
- status data including: last use, items charged out during a given time period, number of items currently charged out, fines owed, etc.?

... allow staff to locally define patron record fields?

- How many fields can be locally defined?
- Can locally defined fields be searched?
- Can reports be generated from locally defined fields?

... record the following data in the patron record:

- items charged out?
- items overdue with due dates and fines owed?
- items the patron has requested be reserved?
- Does it delete records of past transactions?

... allow global deletion of patron records based on date of registration, date of last use, or some other library defined parameter?

... print patron cards on demand?

6. Inventory

Does the automated circulation system

... allow staff to scan barcodes from shelved books using a portable scanning device? Allow staff to specify scope of inventory by starting and ending call numbers or by collection type?

... check for properly shelved items?

... add the inventory date to the item record?

... provide a report listing items and status of items (on shelf, charged out, declared missing)? Can staff define the scope of the report?

7. Circulation Report Generation

One of the weaknesses of microcomputer circulation systems, as compared to mini-computer circulation systems, is their limited ability to generate statistical reports on collection usage by patrons, circulation by type of item or by specific classification and other parameters. Reports on collection usage can be very beneficial in assisting staff to better develop the library's collection resources.

Does the automated circulation system

... generate patron reports including listings by:

- age?
- patron category?
- number of items currently charged out?
- date of card expiration?
- blocked borrowing privileges?
- political subdivision or other type of location code?
- total number of items charged out by a patron during a time interval defined by staff?
- total number of items charged out from a specific collection type, such as videocassettes, during a time interval defined by staff?
- patrons with items overdue?
- patrons with revoked privileges?
- the last date a patron charged out an item?
- patrons with items on hold?

... generate reports on collection usage including:

- the total number of times a copy has circulated within a time period defined by the library?
- the date a specific copy of a title last circulated?
- the total number of times all copies of an item have circulated within a time period defined by the library?
- the date any copy of an item last circulated?
- the total number of circulations within a time period defined by the library and total circulation by:
 - specific collection type?
 - patron category?
 - Dewey, LC or other classification?
- all items that have holds placed on them?
- the total number of items by classification (Dewey, LC, etc.)? How detailed is the breakdown?
- the total number of items by collection type?
- items that have never circulated, circulated once, twice, etc.?
- items that have been reported lost or missing?
- items charged out by patron type?

8. Basic Search Options

Many microcomputer-based circulation systems have some basic search capabilities. These search functions are usually designed to be used by library staff and are not a substitute for an online catalog. For more specific search options see the following chapter.

Does the automated circulation system

... allow staff to conduct basic searching of items while in the circulation mode?
What specific searches can be conducted?

... allow staff to search the master and/or item files? What cataloging information can be searched?

... allow staff to search the patron file? What patron information can be searched?

Summary

Circulation systems can save a considerable amount of staff time spent on routine but necessary circulation-related tasks. An automated circulation system can also help staff better manage the library's collection for the benefit of the library's patrons.

The circulation systems currently marketed have a wide variety of options and features. The task that confronts a library's staff is to ensure that the selected circulation system includes the options and features needed to accommodate local circulation practices.

Chapter 7

Microcomputer Online Catalogs

The implementation of an online patron access catalog (OPAC) can benefit library staff and patrons. Staff can benefit by not having to perform manual work related to card production, filing, updating, creating cross references, and other activities associated with maintaining the traditional card catalog. Once the cataloging data for the collection have been converted and entered into the OPAC, it is not necessary to maintain the card catalog and it can be physically removed from the library. Online catalogs can provide patrons with considerably better access to the library's collection compared to traditional card catalogs. This includes faster searching and more sophisticated search options than is possible using the limited author/title/subject searching available in card catalogs.

Benefits of an online catalog include the ability to

- provide more sophisticated search options including searching by combinations of author/ title/ subject, phrase, keyword, Boolean operators ("and," "or," "and not"), date, media type, call number, publisher, etc.
- provide better catalog maintenance and quality control.
- eliminate card production, filing, and card catalog maintenance.
- provide an up-to-date catalog.
- allow decentralized and/or remote access to the library's database.
- efficiently create bibliographies.
- display status of a title (if a circulation system is also installed).
- provide statistics that report catalog usage.
- teach basic searching skills and reduce users' fears of computers.

To view online catalogs as simply computerized or electronic card catalogs is not only an inaccuracy perpetuated by some vendors who call their OPACs "online 'card' catalogs," but also is a disservice to the benefits already achieved by OPACs and the potential yet to be realized. Many of the benefits of online catalogs listed above cannot be effectively replicated by traditional library catalogs in book, card, or microform format. Conventional card catalogs can be difficult to use unless a patron knows the exact word orders and spelling of a name, title, or subject. Some vendors make online catalogs work for the patron, so that he or she does not need to know exact titles or authors. Thus, it is essential to research the differences found in circulation systems.

Background Information

Catalogs have been automated to some degree for several decades. The early catalogs were book or microform catalogs produced with the aid of a computer. The computer stored cataloging data and sorted the various cataloging entries for printing on paper or to COM (Computer Output Microform). Using computers to provide true "online" catalogs has been a more recent development. Most online catalogs, including those marketed by vendors of large minicomputer-based systems, have existed only for the last decade. The introduction of more powerful microcomputers spurred the development of the online public access catalogs for use in smaller libraries. Most microcomputer-based OPACs have existed only for the last four to six years. The majority of libraries that have installed microcomputer-based circulation systems do not have online catalogs.

Any library considering implementing an online catalog confronts a level of complexity and increased risks not associated with implementing a circulation system. The complex issues and risks relate to microcomputer hardware, the online catalog software, and the sometimes fickle and unpredictable nature of human beings. An example of this latter concern is the possible rejection of the online catalog by the library's patrons.

If an automated circulation system is installed first, which is most often the situation, an online catalog places additional demands on the hardware that can be difficult to determine before the OPAC is actually installed. The OPAC software often requires a significant hardware upgrade as well as additional microcomputers for patrons to use as catalog search terminals. Libraries that can budget for the online catalog software often find they cannot afford the additional hardware.

The most common configuration for libraries with an automated circulation system is to have a single microcomputer at the circulation desk. However, if a library wants both a circulation system and an online catalog, more than one microcomputer will be needed. Both functions cannot operate at the same time with a single microcomputer. Most microcomputer-based automated systems that support both a circulation system and online catalog allow the microcomputers used for these two functions to be physically connected in a local area network (LAN). The local area network is a separate, commercially available program (generally supplied by a local computer vendor) that demands its own level of expertise to install and operate. Thus when librarians want to install both a circulation system and an online catalog, they often find themselves suddenly becoming LAN administrators too. For more information on LANs see chapter eight.

Many libraries that install a circulation system use brief circulation records that lack complete cataloging data. As they consider implementing an OPAC they confront the unpleasant task of finding a method to upgrade their brief records to full cataloging records. Complete cataloging records are essential in an online catalog to allow searching of added authors, series, contents notes, subject headings, and other cataloging data seldom present in brief circulation records. The process of converting or reconverting data to include subject headings and other cataloging data can be very time-consuming and expensive, but it is also essential. Studies of online catalog usage have consistently shown that subject searching is the most common search option that patrons use.

Quality control of cataloging data is another important factor often overlooked when implementing and maintaining an online catalog. While there is no longer any need for maintaining the card catalog, there is still a very real need for maintaining the cataloging data in the online catalog. Most microcomputer online catalogs do not have efficient or powerful editing capabilities as part of their database management system.

Having some type of authority control is directly related to maintaining a high quality database. Authority control is the establishment of a single form of a name or subject heading with appropriate "see" and "see also" references included for related terms. Very few microcomputer systems have any type of authority control system or cross referencing ability for use in the online catalog. Before authority control was used in WISCAT, (a detailed explanation of WISCAT appears in Appendix D) titles by the popular author James Michener appeared under five different forms of his name (Michener, James A.; Michener, James Albert; Michener, J. A.; etc.). Such inconsistencies can make an online catalog difficult to use and can confuse and frustrate both staff and patrons.

Poorly developed editing capabilities and lack of authority control can significantly increase the staff time needed to maintain the library's database. A poorly maintained (or "dirty") database can affect the retrieval of titles from the online catalog. When evaluating vendors' systems, the editing and other maintenance features of the system should be evaluated carefully.

The nature of an online catalog poses increased risks for the library that are not directly related to technical issues. An automated circulation system has to be understood and accepted by the library staff alone. If necessary, staff can spend several days learning all the details of operating the circulation system. However, the operation of the online catalog

must be understood and accepted by both the library staff and by patrons. Patrons will not take several hours (let alone days) to learn to use the OPAC. Unless patrons can conduct simple searches within minutes of approaching the keyboard, they will become understandably frustrated. The most sophisticated searching options in an online catalog are of no value if patrons cannot understand how to use them.

An online catalog is only as good as its organization, including the placement of information on the screen. One of the more subjective aspects of judging an OPAC is to evaluate how it looks and "feels." That is, is it well designed and is its logical organization easy to follow from one step to another?

Unlike a card catalog, an online catalog is interactive. A patron must initiate some kind of action, like typing an author's name at the keyboard and waiting for the catalog to respond. Depending on this response, additional actions may be necessary. With many vendors' online catalogs this type of human-machine interaction is not well designed, and as a result the catalog is difficult to use. This situation can have alarming repercussions. Patrons, angry and frustrated at trying to use a poorly designed online catalog, have been known to demand the return of the card catalog. More than one library has installed a perfectly acceptable circulation system only to confront just such a situation after they implemented an online catalog. For some patrons, especially in public libraries, their first encounter with an electronic keyboard and display monitor will be when they use the library's online catalog. There is no excuse for presenting them with a poorly designed online catalog.

Because of the higher risks associated with implementing an online catalog, it is important to place more emphasis on the vendor's catalog than on the circulation system when evaluating both programs. Owing to these risks, it is strongly recommended that libraries do not select a vendor's online catalog without seeing it actually working in a library. A demonstration by the vendor, while valuable, is not a substitute to seeing the system in operation and talking with staff and patrons.

As noted previously, not all vendors that offer circulation modules also have online catalog modules. If a library will be installing both a circulation system and an online catalog, both of these programs should be available from the same vendor. It is seldom practical nor mentally healthy to purchase a circulation system from one vendor and an online catalog program from another vendor. A multitude of potential problems keeps this from being a viable option.

The Basic Workings of an Online Catalog

To allow searches in an online catalog, the vendor's database management system creates indexes for cataloging data in the cataloging records. For example, when a patron enters an author's name at the keyboard, the OPAC program does not look at every cataloging record in the database to determine if there is a name that matches the one entered by the patron. Instead, it searches for the author's name by checking an index that contains the names of all authors represented in the database. The index has a "pointer" which may be a number or identifier indicating where the actual cataloging record(s) are located on the hard disk. Although this is a very simple explanation, the index structure, the relation of one index to another, and the physical storage of cataloging records on the hard disk can be quite complex. Index options and structure comprise an integral part of the database management system (DBMS).

Creating indexes takes place while the cataloging records are loaded onto the hard disk from a floppy or magnetic tape. At a minimum, indexes should be created for names, titles, and subject headings, which allows at least as much access to the collection as the card catalog. The cataloging data that is indexed will determine what can be searched in the online catalog. Generally, if specific data in cataloging records are not indexed they cannot be searched in the online catalog or searched in a timely manner.

Because what can be searched in an OPAC depends directly on what is indexed, it is important to understand differences in online cataloging indexing options. Some vendors do not allow any indexing of data other than the standard author/title/subjects. The library has no options to index additional data. Other vendors have OPACs that allow the library to index additional cataloging data, such as the publisher, date of publication, or contents notes. Also a considerable amount of non-cataloging data in the MARC record can be indexed to provide more sophisticated searching. Some of these data include the language of a title and its physical format (book, A-V, etc.). It is important to know which options exist, for indexing other cataloging data besides the traditional author/title/subject.

There are also subtle differences between OPACs regarding to inclusiveness of a particular field to be indexed. For example, virtually all online catalog software indexes the author's name. However, with some micro-based OPACs only the MARC field containing the main author is indexed. The names of co-authors, editors, and illustrators, who are normally traced in a card catalog, are not indexed.

Vendors have been reluctant to index all the cataloging data in a MARC record because of the amount of hard disk storage needed to hold the indexes and the adverse effect of a detailed search using many indexes could have on the OPAC's response time. Many microcomputers and vendor database management systems also lack the power to support a sophisticated and comprehensive indexing structure.

Virtually all micro-based OPACs use a relatively simple indexing design that is often termed the "direct index" approach. For example, to search for the book *A Brief History of Time* by Stephen Hawking, a patron types the words of the title at the keyboard. (Note: If the OPAC is semi-intelligent, it will ignore entry of initial articles [a, an, the]. Otherwise, the patron must be instructed not to type initial articles at the keyboard). Most online catalogs that use the direct index approach have implied right-hand truncation. That is, by just typing the words "A Brief History" at the keyboard, the patron will see all titles that begin with those words on the screen. Direct indexes are also created for other data in the cataloging record, including names and subject headings. Appended to the indexed words will be a record number or some form of identification that links the indexed word or phrase with the complete cataloging record. The cataloging records are physically stored in another area of the hard disk separate from the indexes.

The direct index approach is easy to program and does not demand high-level computing power. One of the major advantages to patrons' use of the direct index approach is that the concept is fairly simple to understand. Searching for author, titles, or subjects at the keyboard is similar to the search process used in the card catalog. However, because the patron must know the exact word order of a title or subject, the direct index method has many of the same limitations as the card catalog.

Some microcomputer OPACs offer the direct index option as well as indexing every significant word in the cataloging record. This is often called an "inverted file" or "keyword index." This indexing scheme makes it possible to search by keyword and Boolean operators. Both keyword and Boolean searching demand considerably more computing power and more sophisticated OPAC programs than a straightforward search using direct word order. Because of this, not all microcomputer-based OPACs offer this indexing option.

Keyword searching lets a patron enter any word that is part of an author's name, a title, or a subject heading, regardless of its place in the cataloging record. Using the previous example, a patron could enter the word "time" at the keyboard and the online catalog would list all titles the library had with the word "time" in them, including Hawking's book. Keyword searching can be advantageous when a patron cannot remember the exact title but can recall a word or two.

Boolean searching allows a patron to combine different words that are part of the cataloging record to broaden or narrow a search. It is a powerful searching methodology named after George Boole, the English mathematician who first defined the form of

algebraic expression used in this searching. With a Boolean search, a patron enters the words "whales **or** dolphins" at the keyboard and the online catalog then displays all titles the library owns that have either of these two words in the title. The term "or" in this type of Boolean search broadens the scope of the search. If a patron enters the same search but uses the word "and" ("whales **and** dolphins") the online catalog will display all titles the library has with *both* words in the title. The term "and" in this type of search narrows the scope of the search.

Keyword and Boolean searching offer significantly more sophisticated and flexible search options than available options that use direct index searching. But it can be difficult for patrons to understand the concept of keyword and Boolean searching as opposed to using direct word order. Related to this problem is the difficulty of designing an OPAC that is simple for patrons to understand yet conveys to them the sophisticated search options available with keyword indexing and Boolean operators.

Regardless of the search options that an online catalog offers, most allow patrons to actually enter a search term(s) using either a "command" mode or a "menu" mode. Some catalogs use a combination of commands and menus or they offer the patron the choice of entering commands or using menus.

Basically, in a command system, the patron tells the cataloging software which index to search and what to search within it. For example, on the screen used to enter a search, the words "Enter search:" may appear and the cursor would be located to the right of the colon. A patron who wants to know if the library has *Alaska* by James Michener would enter the search beginning with the word "find. . ." as shown below.

Enter search: find au = Michener and ti = Alaska. In this search the patron tells the online catalog software to search the author index for the name "Michener" and the title index for the word "Alaska." The "and" is used as a Boolean operator to combine both search terms. Most command systems list somewhere on the screen the available indexes that can be searched. The syntax actually used to enter a search, such as the word "find" in the example above, differs with each vendor's catalog.

In a menu system patrons usually select the type of search using a series of function keys or numbers at the keyboard that correspond to various types of searches listed on the screen. With some menu systems patrons use the arrow keys to move the cursor next to the type of search they want.

It is important to realize that some vendors' OPACs offer both a command and menu option. Some vendors also have a searching structure that can best be described as a combination of command and menu systems.

Menu systems function best with OPACs that have simple and straightforward searching options. For the novice searcher, a menu system is often easier to understand than a command system. Some patrons may find this kind of searching less threatening than searching an online catalog in a command-driven system. OPACs with a menu option are easier to learn and use. Unfortunately, simplicity of design often parallels simplicity of searching. That is, it is often difficult to design a truly menu-driven system that allows the same degree of complex searches that can be done on some command-driven systems. However, online catalog studies conducted by the Council on Library Resources and others confirm that the majority of patrons often enter straightforward and relatively simple searches.

Online Catalog Searching Stations

Several factors such as type of library, size of the collection, and physical layout of the collection have a direct impact on the number of workstations needed for accessing the online catalog. Libraries use a number of different formulas to determine how many workstations, or extra microcomputers, their patrons need for searching the online catalog.

Several of the more commonly used formulas include one OPAC station per 20,000 annual circulations or one OPAC station per 150 patrons that enter the library per day. It should be noted that most of the formulas used to try and determine the number of catalog stations needed are not a result of rigorous scientific study. Most of the larger libraries that are still able to install acceptable micro-based systems will find that four to eight public search stations will be sufficient.

One of the advantages of online catalogs is that all of the workstations do not have to be adjacent to each other. It is possible to have workstations at various places throughout the library. Physical space, network cabling, security, glare from lighting, privacy, and proximity to the collection and to staff are all issues that must be addressed when considering the placement of OPAC stations.

Questions and Issues to Consider before Selecting an OPAC

Determining the features that a library needs from an online catalog is not as straightforward as it is with circulation systems. While such criteria as keyword access can be easily stated and determined, the process by which a patron actually enters a keyword search at the keyboard varies considerably from one vendor's system to another. Judging OPACs often becomes a more subjective and intuitive process than judging a circulation system. The general questions listed below, followed by more specific questions, can help serve as a guide to review the online catalogs available from vendors.

- 1. Does the OPAC support a complete cataloging record?** As previously noted, brief circulation records are not adequate for an online catalog.
- 2. What can be searched in the OPAC?** Subject searches often comprise 50 percent or more of patron searches. Patrons often expect cataloging information for all the library's materials to be in the OPAC. This includes serials, paperbacks, and other collections that may not be in the online catalog.
- 3. How easy is the catalog to use from the patron's perspective?** If a patron using the OPAC for the first time cannot enter a simple search within several minutes, he or she may become frustrated and quit using the OPAC. Patrons should always be able to back out of a search one step at a time. Approximately 70 percent of searches are simple searches often using just one word or searching just one field. Complex Boolean searches using several words and qualifiers are rarely used.
- 4. Are the screen displays uncluttered? Are help messages and other screen directions clear and written in plain English? Can the library modify the language on the help screens?** People can only retain four to five rules or instructions in their short-term memory. Consider the reading level of the primary clientele when looking at language on the screen displays.
- 5. How sophisticated (or primitive) are the editing and catalog maintenance procedures?** The ability to add, change, or delete data in an easy and efficient manner is of critical importance in order to maintain (or attain) a high quality database.
- 6. What options/control does the library have to customize the OPAC for local purposes?** Some OPACs allow library staff little flexibility in selecting what fields are indexed, modifying help screens, selecting what and how cataloging information should appear on the screen, etc.

The questions and information provided below are designed to provide background information on the operation of online catalogs and to help determine what features each library needs from an OPAC. Use the questions to ask vendors if their OPACs have the features deemed important. Not all the questions listed are relevant to every library. Also, there

may be other concerns that are important to a library that are not listed. All of the items below that are preceded by ellipses should be prefaced with the phrase, "Does the online catalog."

1. Indexing

Does the online catalog

... index fields/subfields and other data in the cataloging record that are determined by the.

... vendor with no options for the particular library? Does the OPAC automatically index all the fields/subfields selected by the vendor or can the library choose not to index some fields/subfields?

... allow library staff to determine what fields and/or subfields in the MARC cataloging record should be indexed?

- Is there a work form from the vendor that staff completes telling the vendor what fields/subfields are to be indexed?
- Is there a list on the screen or some similar type of on-screen prompt for staff to select the fields/subfields to index?

... use the "direct" index method to index cataloging data?

... index all significant words as keywords?

... index all fields and subfields associated with

- name (personal, corporate, conference)?
- title (including GMD when present in a MARC record)?
- subject?
- series?
- added entries?
- call number?
- contents notes?
- publisher?
- date of publication?

... index control numbers including

- LC card number?
- ISBN?
- ISSN?
- GPO item number?
- publisher number for records?
- other?

... index data in the MARC fixed fields including

- language?
- government publications?
- format?
- type of AV title?
- other?

... have a default stopword list? Can staff change the default list?

... disregard all terms of honor and address (e.g. Mrs., Sir, Dame, etc.) when indexing names?

... not index the initial articles (a, an, the)?

... index the ampersand (&) as "and"? There are many non-alphanumeric characters (colons, slashes, brackets, etc.) that can be part of a cataloging record. How these characters are indexed, or not indexed, has a direct impact on searching the catalog.

... index initials, initialisms and acronyms as separate words when they are separated by spaces, periods, dashes, etc.? Similar to the note immediately above, how the vendor's software indexes initials, initialisms, and acronyms will effect searching. For example, titles beginning with "USA" and "U.S.A." and "U S A" may not be interfiled depending on how the vendor's software indexes such terms.

2. Search Options

The terms and phrases that can be searched in the catalog are closely related to what is indexed.

Does the online catalog

... allow the patron to specify what indexed field (name, title, subject, etc.) is to be searched?

... allow searching in more than one field (e.g. entering both an author and title) as part of a single search?

... allow searching by a specific control number? What numbers can be indexed (ISBN, ISSN, LCCN, MITINET, OCLC, other)?

... allow searching by direct word order?

... allow searching by keywords of all indexed terms?

... allow searching using Boolean operators "and," "or," and "and not"? Can keyword and Boolean search results to be saved or combined to form new searches?

... allow searching using right-justified truncation?

... allow searching using left-justified truncation?

... allow searching using wild cards? Wild cards are special characters, often a question mark (?) or an asterisk (*) that can be entered that tells the OPAC to match on any character in place of the wild card. For example, entering "R?mania" would find all the cataloging records that contained the two variant forms "Romania" and "Rumania."

... allow searching by specific phrase?

... allow searching by call number? Can patrons "browse the shelves" by requesting the next call number that is before and after the call number entered?

... allow searching by browsing the indexes? Browsing the indexes means the ability to have the OPAC display, in alphabetical order, the list of names, subjects, titles, or single words that are indexed for searching.

- ... allow searching to be qualified by**
- date of publication and range of dates?
 - language?
 - MARC format?
 - collection type?
 - general materials designation (GMD)?

... allow the entry of upper and lower case letters (that is, does the OPAC software ignore the differences)?

... allow the entry of extra spaces (software compresses all extra spaces to one space)?

... allow backspacing to correct spelling errors or make other changes without having to reenter the entire search?

... ignore the entry of an initial article (a, an, the) when searching?

... ignore the entry of stopwords and continue the search If the patron enters only stopwords does a message appear on the screen alerting the patron to this?

3. Catalog Organization and Display

Does the online catalog

... operate either in command or in menu mode? Can patrons select which mode to use for searching?

... operate in a combined command/menu mode?

... have an uncluttered introductory screen that briefly describes the OPAC and how to get additional help? Can the language on the screen be modified by the library?

... display context sensitive help messages in simple English to guide the patron through the search process?

- Can the language on the messages be modified by the library?
- Can the patron return to the exact screen being viewed prior to using the help screen?

... provide error messages when a patron makes a mistake? Can the wording of the messages be modified by the library?

... provide a message if the search will take more than 10 seconds? Does the patron have the option to narrow the search?

... allow a patron to terminate a search at any time, including while a search is in progress?

- ... use the same terms or words on screens to always mean the same thing?
- ... use upper and lower case letters on screen displays?
- ... avoid abbreviations and computer or library jargon on all screen displays?
- ... use the same general screen design on all screens?
- ... display the cursor in the same place when moving from screen to screen?
- ... **Support the use of color displays?** While a color display can be pleasing to look at, too much color can be distracting and garish. There is a wide variation in the visual quality of color monitors. Better-quality color monitors cost substantially more than monochrome monitors.
- ... use bolding, inverse video, or special characters to highlight certain words, options, messages, etc.?
- ... use a keyboard with color-coded keys and labeled keys for specific options or features?
- ... allow a search for a known title to be completed from the introductory screen with the patron having to take no more than four specific steps (besides the entry of the search term)? Some OPACs, especially some menu driven catalogs, require the patron to go through too many screens, menus, and options before they can actually enter a search. For experienced searchers this can be extremely frustrating if the OPAC does not provide the option to by-pass this process.
- ... display a screen message when a search will retrieve more than 50 cataloging records?
 - Can staff set the maximum number of records?
 - Can the patron narrow the search without having to reenter the entire search?
- ... display brief data from each cataloging record when more than one record matches the search?
 - Can the library define the amount of brief data to be displayed and how it should be displayed?
 - Is the total number of records retrieved displayed on the first screen?
- ... allow a specific record to be selected from the list of multiple records?
- ... display the cataloging data for single records in a labeled or card catalog format? Can the library change the display?
- ... use multiple screens or scrolling when search results cannot be all displayed on one screen? Can patrons scroll both backwards and forwards?
- ... allow patrons to back out of a search one step at a time?
- ... allow previous searches and the results of searches to be reviewed?
- ... allow patrons to start a new search at any point regardless of where they are in the search process?

... display circulation data (title on the shelf, checked out, etc.) on the catalog screen if the circulation module is also used?

... Reset itself back to an introductory screen if no activity has taken place during a specified time period?

- Is the patron warned about this action?
- Can the time period be set by the library?

4. Other Attributes of Online Catalogs

Does the online catalog

... have sufficient security to prevent unauthorized access to nonpublic files?

... have the ability to act as a union catalog?

- How is this done?
- Can all collections be searched, can searching be restricted by library?
- How are the participating libraries' OPACs updated?

... allow dial access from a patron's home, work, etc.?

- Can this be done using commercially available telecommunications software?
- What types and models of microcomputers can be used (Apple IIs, Apple Macs, IBM PCs and compatibles, Commodores, other)?

... allow the results of a search to be saved to a floppy disk?

... allow the results of a search to be printed?

... record the time that each and all OPAC microcomputers are active by the hour and by the day?

... record the number of searches done by each and all OPAC microcomputers by the hour and by the day?

... record the low, high, and mean response times for OPAC searches by each and all OPAC microcomputers by the hour and by the day?

... provide a community bulletin board service or some other online messaging system?

... provide an average response time of less than five seconds for a two word Boolean "and" search that matches five cataloging records?

... provide an average response time of less than three seconds for a direct word order search that matches two records? It is difficult for the software vendor to accurately answer questions related to performance because it is highly dependent on a variety of factors over which the vendor may have little or no control. These factors include: size of the database, indexing methodology used by the OPAC, the number of microcomputers being used for searching, type and configuration of the local area network, other activity on the system (e.g., circulation), and the specific hardware being used.

... arrive from the vendor with printed guidelines (flyers, cards) designed to be used by the patrons?

Summary

Online catalogs can provide patrons and staff with far wider and more sophisticated access to the library's resources than is possible with a card catalog. However, library staff must realize that OPACs are relatively new, and there is a wide variation in their performance, function, searching options, and utility. Implementing an online catalog entails additional risks that are not encountered in implementing a circulation system. In the final evaluation, the acceptance, or rejection, of an online catalog will be determined by the library's patrons, not the library staff.

Chapter 8

Hardware and Related Issues

Within the last several years, microcomputers and their accompanying software programs have become indispensable in many libraries. Countless libraries, regardless of their size, are using microcomputers for word processing, budgeting (spreadsheets), and as terminals for database searching. However, for reasons outlined previously, the use of a microcomputer to automate circulation and provide for an online catalog is a viable option only in smaller libraries.

Almost all microcomputer software for both circulation and online catalogs currently operates on the various models of IBM microcomputers (PC, AT, PS/2) or IBM compatible microcomputers. If a library must use any of the Apple II models for its automated system it will severely limit the circulation and OPAC software options. Several vendors have now developed programs to operate on the Apple Macintosh. No Mac-based systems are included as part of the vendor reviews in Section III. At the time of the reviews none of the Mac systems were as complete or comprehensive as the PC based systems.

Purchasing Considerations and Options

Almost all vendors of microcomputer-based library circulation and catalog programs supply only the software. Purchasing from the few vendors that do supply hardware is often more expensive than purchasing hardware from a local source or through some government or corporate contract. Unfortunately, purchasing hardware from a source, other than the software vendor, often leads to the classic "multi-vendor" problem. That is, when problems occur with the automated system, the two vendors often blame each other—and the library is caught in the middle. Considering the realities of the microcomputer marketplace, the necessity of working with separate hardware and software vendors will continue.

Larger libraries considering minicomputer-based automated systems often purchase what is commonly referred to as a "turnkey" system. As the name implies, the system is supposed to be as easy as turning the ignition key in an automobile. Naturally this is a gross oversimplification. Just ask anyone who has implemented a turnkey system. However, turnkey systems are advantageous in that both the library software and minicomputer hardware are supplied by the same vendor. When a problem occurs, the librarian does not have to determine whether hardware or software is to blame.

Regardless of who supplies the hardware, it has to be able to support the library vendor's software and operate in an acceptable manner (fast access, minimal down time, etc.). The staff should always consult with the library software vendor on the best hardware configuration to meet the functions and features they need from the automated system. Their library may already have some hardware that can be used.

Few libraries should have to pay the retail cost for a microcomputer and related hardware. Be certain to check with the municipality, school district, library cooperative, or other governing body to see if some type of hardware contract or other agreement exists with a vendor that allows the library to purchase below retail costs. Discounts under such arrangements are often between 25 percent and 40 percent. If no formal agreement exists, ask a local microcomputer dealer if they will offer discounts to a library as a non-profit or educational institution.

It is often considerably less expensive to purchase an IBM PC compatible microcomputer than genuine IBM equipment. There are currently over 60 companies that make IBM compatible microcomputers. These range from well-known firms such as Unisys, Zenith, and Compaq to firms literally operating out of someone's basement. Currently, there are no Macintosh compatibles. The decision to purchase IBM hardware rather than a less

expensive compatible should be based primarily on the recommendations from the library software vendor and the availability of local service.

Another important factor when considering hardware options is the purchase of a local area network (LAN). If more than one microcomputer will be connected to the automated system, the vendor will probably be installing a local area network.

Hardware Compatibility

Librarians considering the purchase of an IBM compatible microcomputer must be concerned with the issue of hardware compatibility. Some vendors have tested their circulation and cataloging software with a variety of compatible microcomputers and are aware of what units function with their software and what units to avoid. Other vendors state (and correctly so) that their software will operate on any "one hundred percent" IBM compatible microcomputer. Librarians usually must rely on the local computer dealer to certify that any particular microcomputer is one hundred percent IBM compatible. (In reality, the only one hundred percent IBM compatible is an IBM!) If possible, avoid purchasing hardware that has not been certified by the library vendor as compatible with their circulation or OPAC software. If a library must purchase a PC compatible that has not been tested by the software vendor, they must be able to return the equipment if there is a problem with compatibility.

If a library will be purchasing an IBM, all of the compatibility issues are not necessarily resolved. IBM created its own issue of compatibility when it introduced its PS/2 series in the spring of 1987. The more sophisticated and expensive models of the PS/2 series (the model 80) use a different method of moving data (referred to as a "bus") within the microcomputer. This data bus, known as the Microchannel Architecture (MCA), is not compatible with the Industry Standard Architecture (ISA) data bus used on the IBM PC/XT/AT or IBM compatibles, or the newer Enhanced Industry Standard Architecture (EISA). Compatibility problems occurred in the cards that plug into the expansion slots of the PC. The card attached to the bar wand for reading the barcodes was not compatible with the MCA and LAN interface cards also had to be redesigned. Most of these problems have now been resolved, but to check with the software vendor to get their assurance that purchasing an IBM with the MCA bus will not cause any problems.

With the introduction of the PS/2 series IBM also introduced a new operating system, OS/2. (This operating system, like MS-DOS, was developed by Microsoft Corporation.) While OS/2 is a more sophisticated operating system, very few software applications, including automated library systems, have been written or rewritten to use it. Most library programs still operate under MS-DOS. Some local area networks operate under MS-DOS while the more powerful networks run under their own operating systems.

Hardware Maintenance and Support

If hardware fails, for whatever reason, how fast can it get fixed or replaced? An automated system that is not functioning for even a day or two can cause major disruptions in the library.

Good initial and ongoing technical support from the computer dealer is absolutely essential. This support is critical regardless of the specific manufacturer's microcomputer. The less experience that a library staff has with microcomputers the greater the importance of support from their local dealer. As microcomputers increase in complexity and library staff need more support from the hardware vendor, the issue of ongoing maintenance will become even more critical.

The details of a local microcomputer dealer's maintenance policies can sometimes be confusing because a dealer may offer several maintenance options which can vary depending on the manufacturer of a microcomputer. An increasingly common practice used by some

dealers, including some mail order dealers, is to subcontract for maintenance with another company. Other dealers will send the microcomputer back to the hardware manufacturer for repair. (Obviously, if the microcomputer contains a hard disk all data will have to be backed-up before taking or sending the unit anywhere.) Regardless of the situation, be certain to fully understand the maintenance policies and costs before making the initial hardware purchase. This is especially important if the library is considering the purchase of an inexpensive PC from a mail order firm.

The level of support often varies substantially from one microcomputer dealer to another, even though both dealers are "authorized" distributors for the same manufacturer's microcomputer. When purchasing hardware through a local dealer always ask them for—and check—references in relation to service after the sale.

Determining the Best Hardware Configuration

In the "old days" of microcomputing (circa mid-1980s) there were just a limited number of options. The process of determining the best microcomputer configuration did not demand a high level of technical knowledge nor a considerable amount of time. However, as microcomputers have become more complex, determining what hardware configuration will provide the best performance has become an equally complex process.

The power, size, and cost of the hardware will vary substantially depending on a number of factors. Some of these include what functions are automated, the installation of a LAN, projected transaction load (number of titles, maximum number of circulations, and the number of micros used for the OPAC), and a variety of other factors. The hardware source must know both the specifications for the PC used as the local area network file server (when installing a LAN) and the specifications for the other PCs used as circulation and catalog stations.

Be certain to obtain the recommended specifications for each microcomputer from the library software vendor. If the staff purchases hardware from a local dealer to support another vendor's circulation or cataloging software, it is very important to ask the software vendor for the optimal hardware set-up, not just the minimal set-up. This is especially important for larger libraries or libraries installing a local area network. To help achieve acceptable performance, the staff wants the best hardware configuration for their library based on both current needs, projected needs, and estimated peak load. When determining the acceptable limits of a system, be certain to project the growth in the collection, circulation, patrons, and the need for any additional microcomputers over at least a five year period, then add an additional 25 percent as a safety factor.

To save money, librarians often purchase just the minimal hardware needed to operate the basic automated system. This can cause major problems in the future when trying to expand the system, add new acquisitions, or retain acceptable response time. Adding hardware to correct these problems can be more expensive, time-consuming, and difficult than originally purchasing a larger and more powerful hardware configuration.

As previously noted, implementing both an online catalog and circulation system can add significantly to the workload of the automated system. Libraries with large collections and high circulation transactions, and libraries that want to automate both circulation and the catalog will find it essential to purchase a fast microcomputer and hard disk drive. Selecting a PC with one of the more advanced Intel Corp. microprocessors (80386, 80486) and a fast processor clock (at least 20 Megahertz (MHz)) will help ensure fast and efficient processing of data once it arrives at the microprocessor.

In addition to having a PC with one of the more advanced, fast microprocessors, it is also very important to have a fast hard disk. With most micro-based automated systems all the data associated with circulation and cataloging is stored on one hard disk. To take the best advantage of a fast microprocessor, it is necessary to move any needed data as quickly as possible from the hard disk to the microprocessor. The process of moving data from a disk

into the computer's processor and back again is referred to as input/output or "I/O". It is only of limited advantage to have a fast microprocessor if the movement of data it is restricted because of slow I/O. The acceptable performance of both circulation and the OPAC are highly dependent on having high I/O of data.

Two major factors that help ensure fast I/O are access time to data on the hard disk and the data transfer rate. Access time on a hard disk includes the time needed for the drive's read/write head to move to the correct track (seek time) and the time it takes for the disk to rotate under the read/write head (latency time) until the sector with the data to be read, or written, passes under the head. The hard disk should have an access time no slower than 28 milliseconds (28 thousandths of a second) and preferably have an access time under 20 milliseconds. Use caution when reviewing literature on hard drives. The time listed may sound fast but it is often the seek time that is listed and not the total access time to data. Fast access time has to be coupled with a disk interface that can handle a high volume of data. The Enhanced Small Device Interface (ESDI), the Small Computer System Interface (SCSI), and the Interface Design Enhancements (IDE) are the three most popular high performance hard disk interfaces. A disk drive with fast access time and a high volume interface can help ensure the most efficient movement of data from the hard disk to the microprocessor. This fast hardware configuration is especially important for the network file server if it will be using a local area network.

The hard disk's size will depend upon the collection size and whether circulation and the catalog will be automated. The need to upgrade a brief circulation record to a more complete record for an online catalog will also have a dramatic effect on the amount of hard disk storage needed. The library will probably need eight to ten times more storage for a full cataloging record and its associated indexes than for a brief circulation record. Unless the staff purchased a large hard disk drive when the circulation system was initially installed, they will have to purchase a larger drive to support the storage needs for the online catalog. Again, consult with the software vendor concerning the size of the hard disk needed for both current and future functions.

The size of the hard disk is primarily dependent on the number of titles, circulations, patrons, function(s) being automated, and the size of the cataloging records and indexes stored by the system.

For microcomputer-based systems a rule of thumb is 1,000-2,000 bytes of storage per title in the collection. Thus, a collection of 40,000 titles would need a 40 to 80 megabyte (MB) drive. This is for both circulation and the online catalog. Hard disks are relatively inexpensive and there is a high economy of scale. That is, an 80 MB drive does not cost twice as much as a 40 MB drive. If possible, always get a larger drive than initially needed. It is essential to have the storage capacity not only for current cataloging and circulation data but also for the new acquisitions that will be purchased over the next five to seven years. In addition there must be disk space allocated for the circulation and OPAC software and the LAN software. There may also be other software (for example, word processing) and other data files on the hard disk, besides the programs and data directly related to the automated library system.

The amount of RAM (random access memory) needed will again be determined by the variables mentioned previously. However, almost all of the more powerful microcomputers have at least one megabyte of RAM and many of them come with two or four MB. Some automated library systems still do not need more than 640 kilobytes (K) of RAM although the systems will use more RAM if it is available. Additional RAM, beyond 640K, is often needed for the LAN file server.

In addition to the microprocessor, hard disk, and RAM there are many other features and techniques used to increase hardware performance. Some of the features like memory caching, interleaved memory, and shadow RAM are beyond the scope of this publication. However, they can have a direct impact on the performance of an automated system. Consult a local computer dealer regarding some of these options.

Microcomputers and their peripherals (e.g. hard disks) will continue to increase in power, in speed, and in the complexity of operations they can perform. Some of the newest microcomputers approach the complexity and power of small minicomputers. In fact, some of them even look like small minicomputers. That is, they are "tower" units designed to stand on the floor next to the desk instead of on top of it.

Library automation vendors are continually redesigning their software to use the latest advancements in hardware. However, writing or rewriting library software programs to take advantage of the latest technology is very time-consuming. Library software development, like other software development, always lags behind advancements in hardware. For example, microcomputers using Intel's powerful 80386 microprocessor have been available since 1987. Yet, there is probably no library software yet written (or rewritten) that takes full advantage of this processor's power. Microcomputers are now available that use Intel's more advanced processor, the 80486. Again, software vendors will have to upgrade their library software programs if they want to take full advantage of the sophisticated features available in this new microprocessor. Meanwhile, Intel has already designed most of the features for the 80586 microprocessor which is scheduled to be introduced in late 1992 and the 80686 expected to be available in 1995.

Other Microcomputer Peripherals

Many of the more expensive microcomputers come with a VGA (video graphics array) interface card that provides for high resolution graphics and color displays on the monitor's screen. For automated library systems this type of interface is often not necessary. Almost all the microcomputer-based automated library systems do not use any graphics and some still only support a monochrome (no color) display. Even programs that do support color will generally operate very well on a less expensive EGA (enhanced graphics adaptor) card. Certainly the judicious use of color can enhance the appearance of any system. If a color display is chosen, be certain to purchase a high resolution monitor. The resolution of some inexpensive color monitors is much worse than inexpensive monochrome monitors. A high resolution monitor is particularly important for the online catalog. Check with the software vendor to see what video interface is recommended.

Most libraries will find that a near-letter-quality dot matrix printer will meet their needs. This general purpose printer can be used to print overdue notices, bibliographies, statistics, and other information. Because of the amount of printing that is usually done it is better to purchase a more expensive printer. Not only are they more robust, but they are faster and can more easily accommodate the forms that may be used for overdue notices and other reports. If a LAN is installed, it is possible to include a laser printer on the LAN in addition to a dot matrix printer. The laser printer can be used for any printing needs that demand high quality. Libraries may find that maintaining a printer attached to a public access catalog station can take more staff time than originally anticipated.

Local Area Networks (LANs)

If a library requires two physically separate circulation checkout desks, microcomputers at each location are necessary. Having a circulation system with an online catalog also implies that the automated system supports more than one function and the use of more than one microcomputer at the same time. The operation of more than one program simultaneously is referred to as "multitasking". An automated system that allows simultaneous use by more than one person is referred to as having "multiuser" capabilities.

Microcomputers were not originally designed to operate more than one program at the same time. Yet this is exactly what must be done when a library operates programs for both a circulation system and an online catalog. Microcomputers were also not designed to be linked together to share data or allow more than one person access to the same program or

function at the same time. Again, this type of connectivity is essential if a circulation system is operational and, at the same time, several patrons are searching the online catalog.

Library automation vendors circumvent the design limitation of microcomputers using one of several methods. The "low-end" solution is to connect several microcomputers via their respective serial ports. This is an inexpensive solution but is usually only practical for physically connecting two machines. This option is not widely used. A few vendors of library systems use a multitasking/ multiuser operating system like UNIX. This is the type of operating system used on minicomputers but it is still not widely used in microcomputers. (MS-DOS, the most popular PC operating system, was not designed as a multiuser operating system.) The most common option used to provide multiple access for microcomputer-based library systems is via a local area network, or LAN.

A LAN is a separate program not related to the programs used for circulation or the online catalog. Most library software vendors do not develop their own LAN software but use a networking software package commercially available from another vendor. Library vendors will usually recommend specific LAN software to use with their library automation software. Some library vendors' circulation and catalog software will only operate on specific LANs. Closely follow the advice of the library vendor when considering your LAN options. The local area network plays a critical role in ensuring the acceptability of a microcomputer-based automated library system. An inefficient or poorly designed LAN can defeat the benefits of the best (i.e. fastest) hardware.

A LAN consists of networking software, cables, and interface cards. The networking software manages the use of programs and data by the microcomputers (often referred to as "workstations") that are attached to it. Each workstation on the LAN is physically cabled directly or indirectly to another. The most popular cabling options include coaxial cable (similar to cable TV cable), twisted pair (telephone) wiring, or optic fiber cable. Each workstation attached to the LAN has a LAN interface card installed in one of the expansion slots in the back of the microcomputer. The cable from one machine is physically attached to the card of another to allow the workstations to communicate with each other. Cable must be laid under the floor, above the ceiling, or in the walls near the location of each LAN workstation. The task of cabling, especially in older buildings, can be a major challenge.

Depending on a LAN's topology, or physical configuration, the cabling for each workstation enables the units to be connected directly or indirectly to each other and to a central "file server". The file server is a powerful microcomputer with a large hard disk. All the programs and data files are stored on the file server's hard disk. This includes the LAN software, circulation, and online catalog software, the library's circulation data, patron data, catalog data, and all the associated indexes. Less expensive and less powerful microcomputers can be used on the LAN for circulation workstations and as workstations for the online catalog. The file server and each microcomputer attached to it has its own technical requirements. For example, a file server may require several megabytes of RAM while each workstation requires only 512k or 640k of RAM.

Some LANs allow hundreds of microcomputers to be networked together. However, in an automated library system, the response time may become painfully slow when several patrons are searching the online catalog and items are being checked out at two different circulation stations. This can occur even if only six to eight microcomputers are active on the network. Response time suffers because the transaction load from all these activities is being funneled through the various workstations to the central file server. The server's hard disk must access the appropriate data that is physically located at many different places on the hard disk. The access time to data on the hard disk and the transfer of that data takes time and can create an I/O bottleneck. This is a major reason why large libraries with high transaction loads cannot implement an acceptable microcomputer-based system. Some LANs support the use of more than one file server to help distribute the transaction load, but this configuration is not yet commonly used in conjunction with automated library systems.

In addition to cabling all the microcomputers to the file server, the LAN software must also be installed on the file server's hard disk. Installing a LAN can present its own set of problems and headaches. With some local area networks the installation process can be a very time-consuming, frustrating, and mind-numbing experience. LAN installation can be more difficult than installing the circulation and catalog software. If no one on the staff is familiar with LANs and no one has a good technical background, have the network installed by the local vendor who supplies the LAN. An experienced technician can often install a LAN in a day or two. It will take a library staff member more time than this just to read the LAN manuals.

Similar to support for the microcomputer, it is equally important to have a high degree of initial and ongoing support from the authorized dealer for the local area network. Depending on the nature of the problem, the LAN vendor will often provide telephone support. Ideally, the same local dealer should supply both the microcomputer hardware and the LAN. If this is not possible, the staff will deal with three vendors: the library software vendor, the microcomputer vendor, and the LAN vendor. This situation is known as the "multi-multi vendor" problem and should be avoided if possible.

Questions on Hardware and Related Issues

Some questions to ask vendors concerning hardware and related issues are listed below.

1. What is the minimal and optimal hardware configuration for the microcomputer which will be used as the file server and the other microcomputers used for circulation, OPAC, and catalog maintenance including
 - operating system?
 - type of microprocessor?
 - speed of the microprocessor (MHz)?
 - amount of internal memory (RAM)?
 - number, size, and capacity of floppy drives (if any)?
 - size of hard disk drive, speed (access time), and interface?
 - number of serial/parallel ports needed?
 - number and type of expansion slots needed?
 - modem (if dial access is supported)?
 - type of video interface (for example, CGA, EGA, VGA)?
 - type of back-up tape unit recommended?
2. What PC compatible microcomputers have been tested with the library vendor's software?
3. Will the library software vendor supply the hardware?
4. What is the cost for the
 - minimal hardware configuration?
 - optimal hardware configuration?
5. What kind of hardware support is available?
 - Will the dealer or vendor set-up the hardware?
 - What is included in the set-up and how much will this cost?
6. What type of printer is recommended?
7. What kind barcode reader is supported?
 - Will the library software vendor supply the barcode reader including the interface card?
 - How much will it cost?
8. What local area networks (LANs) are compatible with the vendor's programs?
 - Does the vendor recommend another vendor's LAN?
 - Does the vendor recommend a specific LAN configuration?
9. What is the maximum number of microcomputers that can be *realistically* installed on the LAN and used as online catalog terminals based on the statistics provided by the library and the desire to retain a five second maximum response time for 90 percent of the searches? (Vendors may not be able to provide exact figures on response time, but they should be able to provide some response times for tests they have conducted in-house. Be certain to ask other libraries that are using the vendor's system about response times.)
10. Can the dealer that supplied the hardware also supply the LAN?
 - How much will it cost?
 - Will they fully install the LAN, including installing the LAN software and attach the cables and interface cards to each PC on the LAN?
11. How comprehensive is the local dealer's ongoing service (assuming the hardware is not from the library software vendor)?
 - How much does ongoing hardware maintenance cost?
 - Can the dealer guarantee onsite help within 24 hours?
12. Are any special site preparation, physical conditions, or power requirements needed to support the hardware?

Summary

Vendors of circulation systems and online catalogs will recommend various hardware configurations for their software. However, librarians are usually responsible for actually selecting and purchasing the specific hardware that will be used. Given several options from the software vendor, staff should purchase the most powerful microcomputer configuration they can afford. This is especially true for larger libraries that plan to implement both a circulation system and an online catalog using a local area network. When reviewing what hardware to purchase it is important not just to consider the library's present needs but any anticipated future needs. In addition to actual hardware performance, the degree of initial and ongoing support from the hardware dealer are critical factors to consider when purchasing hardware.

Chapter 9

Vendors of Microcomputer-based Automated Systems

Maintaining good library—vendor relations is critical to the success of any automation project. This is true regardless of the size or type of library and the type (microcomputer or minicomputer) of automated system being purchased. The responsibility to foster such a relationship rests with both the library and the vendor.

Librarians often have ambivalent feelings when working with vendors which directly affect the relationship between the two parties. For example, while they are directly dependent on vendors to incorporate the features their libraries need from an automated system, librarians feel this dependence places them in a somewhat subordinate position. Instead of being viewed as a customer driving the market, they perceive themselves as being held hostage by vendors who are driving them.

On the other side of the issue, vendors often feel that librarians, most of whom have no substantial programming or data processing experience, have only a vague idea of the complexities involved in programming, maintaining, and enhancing automated library systems. Because of librarians' lack of computer knowledge, their idealism, or naivete, vendors claim that librarians have unrealistic expectations of what computers and automated systems can do. Naturally, when these expectations are not met, they blame the vendor.

The Marketplace and Vendor Viability

It may come as a surprise to some librarians to realize there is very little crossover between vendors of automated library systems that operate on minicomputers and vendors of library systems that operate on microcomputers. For all practical purposes, these are two distinct markets addressed by different vendors. It is often time-consuming and expensive to rewrite software, originally designed to operate on a minicomputer, to operate successfully on a microcomputer. Vendors must also develop and maintain customer support for two different versions of their software. With profit margins relatively low on microcomputer-based systems, there is little financial incentive for vendors of larger minicomputer systems to rewrite software and develop corporate strategies designed to address the needs of the small library automation market.

No one wants to select a vendor's system only to realize soon afterwards that the company is no longer in business. The marketplace for microcomputer-based systems is still very volatile. Some companies that start in the basement never make it farther than the garage. It takes a considerable amount of time, commitment, and initial investment before vendors become profitable, and some never do. Lack of profitability is caused by a variety of factors including under-capitalization and the relatively low profit margin on circulation and OPAC software. This latter problem is especially prevalent with microcomputer-based systems. Many vendors sell both their circulation and the online catalog software for under \$5,000 with some vendors offering both modules for less than \$2,000. Low profit margins often contribute to cash flow problems that have caused more than one vendor to drop out of the library automation market. Low profits or no profits have also forced large corporations to discontinue developing and marketing automated library systems even though the corporations, when taken as a whole, are financially healthy. If the company is a publicly held firm, their financial records must be open for review. Unfortunately, many vendors are privately held corporations that are not legally obligated to fully disclose their financial status, although it can always be requested.

Librarians often believe that a vendor who has sold a large number of systems will always be committed to the library automation business. This is not necessarily true. One measure of vendor commitment to the market not directly related to total installations is a regular schedule for releasing new, enhanced versions of their software. If a vendor has not issued any enhancements in the past year, ask them why. It may be an indication of financial problems, staff turnover, lack of planning, lack of commitment, corporate complacency, or other problems.

As a matter of policy, always ask the vendor for the total number of installed and fully operational systems and the number of systems installed within the last year. Vendors of larger minicomputer systems readily supply this information. However, because of the state of the marketplace, many vendors of micro-based systems do not provide this information, or they are purposely vague in their answers. Unfortunately, most vendors have yet to realize that such a corporate mind set raises questions about their credibility and does a disservice to them and to the libraries they purport to serve. For obvious reasons, vendors that have sold very few systems are usually reluctant to admit this fact. Simply because a vendor has sold a large number of automated systems is no reason to automatically assume their system is better than another less popular system or that it is the best system. (Select the system that best meets the needs of a specific library, not the needs of some other library.) The popularity of some automated systems may be more a factor of the vendor's marketing ability rather than on the abilities of their system.

Sometimes a vendor just entering the market (or a vendor that has substantially revised an existing software program) will offer their new program at a significant discount. While this can be financially attractive, a library may pay for it in time spent working out the bugs. Do not be the first library to install a vendor's new system unless someone on the staff has a solid technical background, a spirit of adventure, a well-developed sense of humor, and plenty of time. As a general rule, never purchase version 1.0 of anything.

A vendor's credibility is also questioned when a new or enhanced program is announced to be available on a certain date. The date arrives but the software does not. There are certainly situations in which the vendor simply misjudges the amount of time it will take to deliver the product. There are also instances where vendors will announce new or upgraded programs more as a marketing ploy to convince customers that, while the vendor's system does not have a feature, it will soon have it in the near future. (One of the most abused phrases is, "Our system doesn't do that now, but it may be available in the next upgrade.")

Vendor Support for Their Automated System

One of the more critical aspects of installing and operating any automated system, regardless of the type, is the level of vendor support. With automated library systems this support is essential because most systems are implemented and operated by library staff who are not trained data processing professionals. The situation is especially prevalent in smaller libraries implementing micro-level systems. When problems occur during implementing the system or during its daily operation, there must be someone to contact for help immediately. When checking vendor references, one of the first questions to ask is whether the library is satisfied with the level of support they receive from the vendor.

Most vendors provide a certain amount of "free" support as part of purchasing the circulation or OPAC programs. This can vary from 60 days to a year. Be certain that the initial support does not start after receiving the software. It should take effect when the library has actually installed the software, assuming this is done in a reasonable timeframe after the software is purchased. Some libraries purchase software and do not even open the package until six months after it is received. It is unreasonable to expect the vendor to wait this length of time before starting their initial support. After the initial period of support, libraries have to pay for continuing support. Some vendors have several different customer

support plans to select from based on specific needs. *It is strongly recommended that a library maintain some type of software support.*

If requested, most vendors will send a technical support person to a library to do the actual installation of the circulation and online catalog software. This service is seldom included in the cost of the software package. The cost to the vendor for a technician to spend a day or two at a library may be more than the cost of the software. If the staff pays the vendor for the installation, be certain to ask what must be done before the vendor's technician arrives. Generally, the hardware must already be installed and, with some systems, the LAN must also be operational. Whether a library decides to pay the vendor to install the programs will depend on the complexity of the program and the technical expertise of the library staff. Some of the simpler circulation programs can be installed by staff who do not have a substantial amount of technical knowledge but are at least familiar with general microcomputer operations such as copying files and creating hard disk directories. *Always check with the vendor concerning the complexity of installing the system and installation options.*

Similar to the question of who installs the library software is the question of who will provide training to the staff on using the automated system. Again, most vendors will provide onsite training for a fee. Sometimes the same person who installs the system in the morning does the training in the afternoon. Other vendors have separate staff assigned to these two tasks.

Questions for Vendors

The questions below should assist staff in evaluating the level of assistance expected from vendors, and how much their programs and ongoing support will cost. They should be asked before making any commitment to purchase a particular vendor's automated circulation program or online catalog.

1. Is the sales representative reliable and knowledgeable about his or her programs?
2. How much does the circulation software cost and when will the library have to pay for it? *With most vendors, an invoice for the software arrives in the same package as the floppy disks containing the software. Most vendors give a standard 30 or 60 days to pay for the software. If possible, avoid paying for the software until it is installed and working properly. Check one.*
 - ☐ upon receipt of the software
 - ☐ upon installation of the software
 - ☐ upon acceptance of the system by the library
3. How much does the online catalog software cost and when will the library have to pay for it? *Check one.*
 - ☐ upon receipt of the software
 - ☐ upon installation of the software
 - ☐ upon acceptance of the system by the library
4. What is the vendor's policy on returning software that does not have a feature that the library must have? *Staff should take full responsibility for determining to the best of their ability whether the software meets the library's needs before it is purchased. If the vendor's software is missing some major feature it often is a reflection of inadequate investigation by the staff.*
5. Is there a separate cost for the database management program? If so, how much is it?
6. What other software-related costs are there? *Check one.*
 - ☐ authority control
 - ☐ bibliographic interface for downloading records
 - ☐ other
7. Is there a discount if several of the programs are purchased at the same time or if the library already owns one of the vendor's modules?
8. Can the circulation and online catalog software modules be purchased separately or must they both be purchased at the same time?
9. Will the vendor send a demonstration program on floppy disk or a videotape showing their system to review before purchasing the system? *Demo disks and videotapes can prove helpful as an introduction to a vendor's system. Be sure to ask if these show the same functions and screen displays as the "live" system or if it is only flashy promotional material on disk or tape.*
10. Will the vendor provide a set of documentation or manuals for review before making a commitment to purchase the system?

Questions for Vendors

11. What library market (school, public, special, academic) is the vendor targeting?
12. Will the vendor provide at least four references from other libraries that have purchased their system, preferably libraries of the same type and similar in size to a specific library)?
13. Is there a library users' group and a users' group or vendor-published newsletter? Users groups and newsletters can be a valuable vehicle to keep the vendor informed of their customers' needs. Some users groups are totally independent organizations, while others are sponsored and supported by the vendor.
14. How many libraries have the vendor's program installed and operational? How many libraries have purchased the system in the past year?
15. What is the largest library that has the vendor's automated system installed and fully operational?
 - type of library?
 - collection size?
 - annual circulation?
 - number of patrons?
 - number of terminals (microcomputers) accessing the system?
 - software modules in use (circulation, OPAC, other)?
16. Will the vendor provide guidance for retrospective conversion? Does the vendor have a MARC-based conversion program?
17. What options does the vendor have for initially loading MARC records? How much will this cost?
18. Will the vendor come to the library and install the circulation or online catalog program?
 - How much will this cost?
 - How much time will the installation process take?
 - What does the library have to do before the vendor arrives?
19. If the vendor's cost for installation is too high, can the system be installed by library staff who have only a "basic" knowledge of microcomputers? Is clear and comprehensive installation documentation provided including pertinent information for installing the system on a local area network?
20. Once the system is installed can it be operated by someone who has only a basic knowledge of microcomputers?
21. Will the vendor come to the library and train the staff on using the program?
 - How much will this cost?
 - How much time is needed for training?
 - Is this included as part of the installation process?

Questions for Vendors

22. What kind of technical support and maintenance is provided by the vendor?
- What support is provided as part of the initial purchase?
 - What are the specific costs and options for ongoing program support? Ask for a detailed breakdown.
 - During what hours of the day is support available?
 - Is a toll-free number available?
 - Can the vendor dial into the automated system to help determine problems?
 - What extra costs, including hardware and software, are there for this service?
 - How many staff are in the customer support area?
 - What is the level of expertise of the support staff?
23. Will the vendor fix program "bugs" and send a replacement program at no cost?
24. What is the vendor's policy on the release of new or enhanced versions of their programs? Never judge a vendor's system based on only the *promise* of new features or a system upgrade. Too many times vendors promise products and enhancements ("vaporware") that they cannot deliver or deliver long past the intended date of delivery.
- Does the vendor have a regular schedule for new or enhanced versions of the software?
 - Has it consistently met the schedule?
 - How many enhanced versions of the circulation or cataloging software has the vendor released in the last year or two?
 - How much will it cost as an existing customer to purchase the enhanced version of the software?
 - Will additional hardware be necessary to install the enhanced version?
 - Will the vendor still support the old version if staff decide not to install the enhanced version? For how long?
25. Does the vendor have any other library-related programs available and what are they? *Check one.*
- ☐ acquisitions
 - ☐ serials
 - ☐ media booking
 - ☐ other *Specify*

Summary

Librarians must be aware of the fluctuating nature of the marketplace for micro-computer-based automated systems. A vendor's reliability and ongoing support of its programs are often as important as the specific features offered in the vendor's circulation or catalog software. It is the responsibility of the library to investigate a vendor's reliability, commitment to the marketplace, and level of customer support. The development of a good library-vendor relationship is a key factor in the successful implementation and ongoing operation of any automated system.

Reviews of Microcomputer-based Automated Systems

Chapter 10: Columbia Computing Systems

Chapter 11: Data Trek

Chapter 12: Follett

Chapter 13: Library Automation Products

Chapter 14: Library Corporation

Chapter 15: Media Flex

Chapter 16: Winnebago

Chapter 10

Columbia

The Columbia Library System, formerly the Ocelot System from ABall Software, is a fully integrated system with five modules which may be purchased and used separately. The modules are: Circulation, Catalog, Acquisitions, Serials, and MARC Record Interface. This review describes the MARC Record Interface, the Catalog module, and the Circulation module.

Columbia Computing Services, in the past, has focused on school libraries with "The School System" but now has The Columbia Library System in over five hundred school, public, academic, and special libraries.

Product:	Columbia Library System
Version:	2.0
Company:	Columbia Computing Services, Inc. 999 Plaza Drive, Suite 400 Schaumburg, IL 60173
Phone:	(800) 663-0544, (708) 330-6309

Database Issues

The database contains one master cataloging record for each unique title. Item records for each copy in the collection are linked to the master record for circulation purposes. Columbia claims the system can handle 150,000 master records and 20,000 patron records. Up to 999 item records may be attached to a master record. Currently most libraries using this system have between 15,000 and 30,000 unique titles. The largest database using both the Circulation and Catalog modules contains approximately 50,000 titles. The most terminals (additional microcomputers) operating on a single network is 30. Columbia is currently installing its automated system in a small academic library containing 170,000 titles.

The system can store a full MARC record. The library determines what will be included in the record ranging from a minimum of a barcode and short title, to a full MARC record. Columbia uses a two digit tag rather than the three digit tag found in the standard MARC record. Columbia claims that the tags are unique for MARC compatibility.

Database Creation. Columbia Computing Services does not have the ability to take MARC records on a nine-track tape and transfer the records onto floppy disks. However, Columbia is currently working with Library Technology Inc. (LTI) to do this transfer. Contact LTI for more specific information on how this is done and what the costs are.

The MARC Record Interface module can download records onto the hard disk from: 1) CD-ROM media such as BiblioFile and WISCAT; 2) database vendors such as Marcive, OCLC, Geac, and Utlas; 3) publishers and vendors who provide cataloging records in MicroLIF format with book purchases; and 4) keyboard programs, like Mitinet/marc.

The conversion of MARC records to the Columbia Library System's record format is controlled by tables. Library staff may specify which MARC tags and subfields should be transferred. The system provides default tables for regular monographs and common MARC vendors. Staff may define a separate table to accommodate MARC records for serials, A/V, manuscripts, and other MARC formats.

Despite the ongoing attempts at standardizing MARC formats, vendors still provide different MARC versions of the same title. The "analyze mode" of Columbia's MARC Record Interface takes a MARC record on input and outputs the same version of the record that would have been stored if the library had loaded the record without any modifications. This feature allows staff to modify the input parameters to insure a consistent record format. It is possible to store separate parameters for each vendor to avoid editing the parameter table every time titles are input.

The Interface allows staff to modify records to local specifications and to add copy, barcode, and location information, if it is not already in the MARC record. If the LCCN is present in an existing record, it will reject the new record and make note of it in a report file. If only the ISBN is duplicated, it will print a warning but still proceed to add the record.

Ongoing Conversion and Database Maintenance. Usually, if a library purchases only the circulation module of most microcomputer-based automated systems, the automated system uses only short cataloging records and does not have the ability to load and maintain full MARC records. The Columbia Library System is an exception. All the features of the catalog maintenance facility described below, with the exception of local authority control, are available even if the library purchases only the circulation system.

The catalog maintenance software supports input of MARC records in batches from floppy disks via the MARC Record Interface or by direct entry through the keyboard. Cataloging records are date stamped to allow extraction by date entered or date edited.

The catalog maintenance menu selections include: entering a new record, copying an existing record, editing an existing record, deleting records, or editing a list of records. Records can be selected by author, record sequence number, subject, title, or ISBN. (The record sequence number is a number assigned to a record when it is initially entered into the system.)

Once a record is found, the user can select the area of the record to edit (bibliographic, authorship, subject, title, notes). Once within one of these areas, the user then specifies the tag of the field to be edited. The system uses an abbreviated two-digit tag rather than the actual three digit tag. When entering titles, the user can specify non-filing characters. The first 200 characters of the maximum 500-character title field are indexed.

The catalog has local authority control functions. The index of authorized terms is generated from the data entered in the initial database. The cataloger may browse the authority files and select a displayed entry to be added to a record without retyping. Cataloging data that is under authority control include: names, subjects, and titles. Cross references ("SEE" and "SEE ALSO") can be linked to any authorized terms. Global changes can be made, including consolidating two headings into one. Deletions are not allowed on authorities still assigned to titles. When an entry is removed, all references to that entry are automatically removed.

The system can print card sets with tracings, shelf list cards only, acquisition lists, and data entry proof sheets. The output can go to the printer, screen, or disk. The Columbia system can download records from the system to floppy disks in the MicroLIF format but not the MARC format.

Online Public Access Catalog

Simple searches are allowed by author, title, subject, and call number. The system supports right truncation. The user may browse the authority files and select directly from the list. The authority display indicates cross-references and allows the user to search "SEE" and "SEE ALSO" references without rekeying. From the keyword searching menu, the patron may select searching by author, subject, title, notes, or mixed keywords. The library can also specify additional fields to be indexed such as language, date, publisher, and place. The patron may use the Boolean operators AND, OR, and NOT as well as the arithmetic

operators "<", ">," or "=", or any combination of these. The patron may also use parentheses to override precedence. Within a single field, keywords will be implicitly joined by "AND" logic. Entering "Thurber James" and "James Thurber" in an author search will match the same records. The user can override the "AND" logic by explicitly stating other Boolean operators. The ability to do this is not stated on the screen but is explained in the online help screen. In the combination search it is possible to search across fields. The field to be searched is denoted by the first letter of the field, followed by a backslash and the keyword to be searched. For example, "AVJames" would search for "James" in the author field; "SVJames" would search for "James" in the subject field. Leaving off the "A\" would cause the system to search for "James" in not only the author field but the subject and title fields too. The system has a stop word list which may be customized by the library.

Once a keyword search is completed, the number of titles matched is displayed on the screen. Only three titles are displayed at a time on-screen, and the display does not include a record number. Also, it is difficult for the user to determine where he or she is while searching through a long list. The resulting titles may then be displayed on the screen, printed, or saved to a disk. The titles that are matched from a search may be sorted by title. The user then selects either brief cataloging data (author, title, call number, edition, date) or full data which is in a catalog card format. When viewing the cataloging data, the patron can scroll down or up through the information that is displayed on the screen by pressing the appropriate arrow. The system will save up to nine searches so the user can backtrack rather than re-enter a search. Result sets from previous searches may be joined by Boolean logic. This process will be familiar to those who have done online searching.

If the online catalog is used with the circulation module, the system displays the circulation status by listing an available option. If a title is currently checked out, it will display the date due and the number of reserves on the title, if any. The catalog module supports up to 120 sublocations for a union catalog. Card sets or machine readable records can be generated for each location to support centralized cataloging services. Columbia's OPAC is one of the few microcomputer-based online catalogs that allows remote access via dial-up through a gateway on the local area network.

Circulation

The system uses barcodes and a bar wand for check-in/check-out, renewals, fines, overdues, and reserves/holds. It also allows entry of patron and item barcode numbers at the keyboard. Searching may be done on a patron's name or on a title to retrieve barcode numbers for circulation transactions or to determine the current status of the patron or item. This facility allows check-out by phone. Searching for an item can also be done in the circulation module using the author, subject, and ISBN fields.

As stated earlier, the system uses a master title record with item records attached to it. The item record fields are: copy number, media loan type, price, location, temporary location, call number, lost/ damaged, record sequence number, date last circulated, times circulated, times reserved, times fined, times overdue, inventory date, and bar code number.

The patron record consists of the patron barcode number, loan type, expiration date, returns claimed, first name, last name, address, city, state, zip code, phone number, location, and grade level. The patron record has five fields that the library may define for its own use. The system can print patron cards in a library-specified format.

The library may set defaults for fields in the patron record. This makes it unnecessary to key-in information that is often repeated including the city and zip code. These defaults are easily overridden. Both patron and item records may be added "on the fly." That is, if there is no item data for the title the patron has in hand or the patron is not registered, the item or patron data can be entered at the keyboard while the patron is waiting at the circulation desk. Expired patron records may be renewed or deleted in batch if all items are returned and fines paid.

The system alerts staff if the patron checking out an item has an expired card, the maximum number of books already checked out, too many renewals, outstanding fines or loans, if the item was not checked in, or if the patron was blacklisted for any reason. These alerts may be overridden by authorized staff. The system does not print due date slips.

There are 30 possible material loan types and 30 possible patron loan types. The material loan parameters include: regular loan period, renewal loan period, maximum renewals, and lost fee. The patron loan parameters include: fine limit, fine rate, maximum number of items allowed, card expiration, hold, reserve, and renewal periods.

To determine the loan period for a transaction, the system chooses between the loan period set in the material type and the loan period in the patron type by accessing a priority list setup by the library. Loan periods can range from ten minutes to three years. The actual due date is automatically calculated using an internal calendar that accounts for days the library is closed. The calendar setup option allows the library to select days of the week that it is closed (Saturday, Sunday, etc.) and up to 36 holidays.

An interesting feature of the Columbia system is its ability to set a date other than the current date to check in books. If the library is unexpectedly closed due to inclement weather or other problems, the library can back date the system to check items in "yesterday" to avoid unnecessary fines. The library can allow grace periods. If an item is not returned within the grace period, fines accrue from the original due date.

There is no separate renewal function on the menu. Items may be renewed using the check-out function. The system automatically renews an item using the renewal loan period if it is being checked out to the patron who currently has it out. The renewal period may be different from the original loan period. Again, the priority between the renewal period set in the material type and the renewal set in the patron type is determined by the library.

Fines are assessed using the fine rates set in the material and patron types. Again, the priority between the two is determined by the library. Fines may be paid or forgiven. Partial payments are accepted. Library staff may declare an item as lost or missing and assess a fee for it.

The system prints overdue notices. The format is defined by the library and can include any fields from the patron and item records. The sequence and number of notices is also user-defined and includes a billing notice as the last notice.

The system allows multiple reserves at the title and item level and stores the reserve queue in chronological order. This order may be changed by authorized staff. Time limits can be set on holds. The system alerts staff at check-in if an item has a reserve on it and prints a reserve waiting notice automatically. Staff is also alerted if a reserve is attempted on an item which has not been checked out. If an item is lost or missing, the system cancels any outstanding reserves on the item and automatically generates reserve cancellation notices. Reserve/hold availability and reserve/hold cancellation notices can be printed.

A separate function on the main circulation menu allows staff to display the current status of a patron on the screen or have it printed out. The displayed information includes: date of last item checked out, number of items currently out, titles of books out, due dates, fines owed, and any outstanding reserves. Current status of any particular item may also be displayed on the screen or printed out. This information includes: date of last circulation, circulation count, current status (checked out, on shelf, etc.), number of holds on the item, and date due. The screen display for the current status on items and patrons sometimes exceeds the width of the screen. Staff must use the arrow keys to move the screen to the left to see what is off the screen to the right.

Inventory can be done using a portable bar wand reader. The system allows partial inventory to be done on specific shelf ranges with reports run on the last day. Lists can be printed of missing, lost, and damaged items. A report of items by frequency of use may also be printed.

The system retains two years of statistics online which is more than most systems. The daily circulation statistics report includes number of items checked out, renewed, and checked in, the number of holds placed and canceled, the number of fine transactions paid

and forgiven, and the dollar amount of fines paid and forgiven. Monthly and yearly summaries are generated using the same categories. Because the system retains two years of statistics, the library can generate comparative statistics. For example, total circulation for January of 1988 versus total circulation for January 1989. The system can print spine labels (batch or individual), and bookpocket labels. Any standard bar code may be used but Columbia recommends using Codabar.

System Attributes. The main menu consists of pull-down menus which are highlighted and activated using the arrow keys. Throughout the program the designers have chosen to give the users a finite number of responses from which to choose rather than requiring the user to type in information, thus avoiding many input errors. All the modules, with the exception of the catalog module, follow this easy-to-read and easy-to-use design. The catalog module's user interface is currently being updated to conform to the style of the other modules. Context sensitive help screens are available by hitting the F1 key.

If no activity takes place during more than a preset amount of time, the system reverts back to the main menu. The library chooses the time period to reset the system back to the main menu. If staff forgets to complete a check-out transaction, wanding the next patron card will cause the last transaction to be completed and the new one begun.

Networking. The system can run on local area networks including 3COM, Novell, or PC-LAN. The number of microcomputers that can be networked is dependent upon the specific network selected.

Backup and System Security. The system maintains security through passwords. Five levels of security are available from restricted patron access to unlimited functions for senior staff. These password files are common to all modules. An unlimited number of users may be assigned passwords. Patron privacy is protected by removing the connection between a particular item and that patron once the transaction is complete.

Since the demonstration, Columbia has released a portable check-in/check-out system using the Percon hand held barcode reader which could be used as a backup circulation system if the main system goes down.

Hardware/Software Requirements and Costs. Like most microcomputer vendors, Columbia Computing Services does not provide hardware but it will help a library determine exactly what hardware it needs. The system requires an MS-DOS or PC-DOS microcomputer such as the IBM PC AT, any PS/2 model, or Tandy 1000 TX, 3000, or 4000. A stand-alone configuration requires 384K of memory (640K recommended), 20 to 44 MB hard disk, 360K or 1.2 MB floppy diskette drive, monochrome or color monitor, extended graphics video card (Hercules or compatible, CGA or EGA), and a parallel printer port. Local area network workstations require 384K of memory (640K recommended), an optional hard disk, one floppy drive, monochrome or color monitor, extended graphics video card, and an optional printer port. The printer should be an IBM compatible 80 column dot matrix parallel printer. Also needed is a bar wand for circulation purposes. A tape backup for larger collections is recommended.

The pricing information listed here is from Columbia's educational price list (December 1989):

Software	Software License	Annual Maintenance
Circulation	\$1095	\$145
Catalog/OPAC	\$1325	\$175
Acquisitions	\$1325	\$175
Serials	\$ 545	\$ 75
MARC Interface	\$ 545	\$100

Shipping and handling is \$20 per module. Quantity discounts are available. Training workshops at Columbia Computing Services in Vancouver, Washington are two days long and cost \$330 per person. An on-site two-day workshop is \$1,995 plus expenses and can accommodate up to 20 attendees. There is an additional \$25 fee per person for workbooks.

Vendor Support. Columbia Computing Services was established in 1968. It has been directly involved with library automation systems for the last six years. The vendor will work with a library to determine its hardware and software needs. The software maintenance agreement includes toll-free phone support, regular software enhancements, membership in a user's group, and subscription to a quarterly newsletter, *The Bulletin Board*.

Miscellaneous. In addition to their circulation and OPAC modules, Columbia is one of the few vendors to also offer modules for material acquisitions and serials control. The Columbia Library System was formerly known as the Ocelot system originally developed and marketed by ABall Software of Regina Saskatchewan.

Chapter 11

Data Trek

Data Trek's Card Datalog is a microcomputer-based library automation system which features four integrated modules: Catalog, Circulation, Serials, and Acquisitions. Their available modules are the Universal Searching Module, Corporate Documents, Audio/Visual Handler, and Databridge (a MARC interface). Any module can be used as a stand-alone or used in combination with others for an integrated system. This summary will discuss only the Circulation, Catalog, and Databridge modules.

Data Trek makes no claims in its literature as to the capacity of its system but the largest public library currently running both the circulation and catalog modules contains 150,000 items in its database and has a yearly circulation of 950,000. The most terminals on a single network is 30.

Product:	Card Datalog
Version:	5.0
Company:	Data Trek Inc. (DTI)
Address:	5838 Edison Place Carlsbad, CA 92008
Phone:	(800) 876-5484
Fax:	(619) 431-8448

Database Issues

The system has a single master bibliographic record for each unique title. Item records for each copy are attached to the master record for circulation purposes. The database managements system (DBMS) used is a variation of dBase, a commercially available database program used in a wide variety of applications. Data Trek plans to release a new program, the Ultimate Library System (ULS) in the summer of 1991. The ULS does not have some of the restrictions found in the current program.

Version 5.0 of the system does not store the record in MARC or MicroLIF format. The fields in the master record and their maximum length are as follows:

Title	120 or 220 characters
ISBN/ISSN	115
Call number	40
Publisher	40 (includes place and publisher)
Collation	30
Series	65
Volumes	5
Copies	4
Author	50 or 125 (unlimited number)
Subject	35 or 65 (unlimited number)
Added Entries	35 or 65 (unlimited number)
Notes	420

Indexed fields in the master bibliographic record are: title, call number, series, author, subject, and added entry.

The fields in the item are:

ID (barcode)	8 characters	Location	30
Volume	15	Type	3
Copy	4	Receive date	6
Medium	4	Cost	8
Edition	20	Descriptor	50
Year	9		

The ID (barcode) number field in the item record is indexed.

If the circulation module is installed, the item record also contains the following fields:

Last transaction date	6 characters	Date item lost	6
Date claimed returned	6	Trap message code	3
Number of renewals	2		

If the circulation module is installed without the catalog module, the item record includes title, author, call number, cost, date catalogued, and ID (barcode) number. If the catalog module is added at a later date, the library would have to reload the database with full records. If the library never plans on using an online public access catalog (OPAC), this would not be a concern. The library could purchase both the circulation and catalog software initially and leave the OPAC hardware (i.e. additional microcomputers) purchases for some later date.

Field names can be changed but the functions of those fields cannot be changed. There are no user-definable fields.

Database Creation. Data Trek can extract MARC records from a nine-track magnetic tape and download the cataloging data onto floppy disks. The library can then load the data from these floppies onto the system's hard disk. The cost is a \$200 setup fee plus 5¢ per record. Data Trek can also accept records from BiblioFile.

Ongoing Conversion and Database Maintenance. For ongoing conversion, Data Trek sells the Databridge MARC Conversion Module. As its name implies, this module takes data from machine-readable records in MARC and MARC-like formats and loads it into the system. The module allows the user to set parameters to specify which fields are to be stored in which locations in the master and item records. Records are automatically added to the new entries file of the catalog module. The system does not store a full MARC record. Records may be entered via the keyboard using the catalog module. When given the number of volumes and/or copies, the system automatically generates item records for each unique title. The user can then edit the individual item records.

There is no authority control with a circulation-only system. If the catalog module is installed, the system maintains name, subject, and added entry authority files. When cataloging, if a name or subject is similar to existing entries in the authority file, the system will display the similar headings and allow the cataloger to select one of the headings listed. If an existing heading does not match a newly entered name or subject a new authority record can be created.

In a circulation-only system, item records are added immediately to the database. With the catalog module, records are added in batch. They are first written to a temporary file which can be proofread and edited. After this step they are then processed and added to the database. Updates can be made on records including global updates for authors, subjects, and added entries.

The catalog module has the ability to establish "see" and "see also" references. One "see" reference or up to 999 "see also" references are allowed for each author and subject. Cross references are automatically listed but not searched.

Record Output. The system will download records to a floppy disk but the records are not in the MARC or MicroLIF format. The Ultimate Library System (ULS), will download records in the MARC format.

Online Public Access Catalog

There are two methods of searching the database using the Catalog Module. The catalog main menu lists both an "Online Catalog" and "Boolean Searching." A third alternative is to use Data Trek's "Ultimate Search Module," which is purchased separately.

The online catalog allows searching by title, author, subject, call number, series, added entry, or ID (barcode number). Automatic right truncation is supported in all but the ID search. In response to a search request, the system displays five or more abbreviated records beginning with the record which is as close as possible alphabetically to the original entry. The user may then browse forward or backward in the listing, request to see a complete record, or start a new search.

The abbreviated record includes the title, date of publication, ID number, ISBN/ISSN, and call number. The complete record displays, in addition to the above, authors, subjects, notes, publisher, edition, collation, and location and cross references when appropriate.

Data located in the field used for searching are highlighted. For example, if patron searches by author, the author's name is highlighted when the complete record is displayed on the screen. If there are fewer than a full screen of entries that match the request, the system fills the screen with entries that follow in alphabetical order. This can be somewhat confusing for the user who is searching for a particular subject and several unrelated subjects are highlighted on the screen.

The online catalog uses a direct index technique. That is, the searcher must know the first word or words of the title or subject. The library may also elect to allow keyword searching on title and subject. For keyword access the library must select this option when initially setting-up the system to create the required keyword indexes.

The OPAC's default stop word list consists of the words "the," "an," and "a." It is not possible to modify the stop word list. A more complete stop word list is available at extra cost if the library purchases the foreign language option. The foreign language option allows instructions to be displayed in French, Spanish, German, and Italian in addition to English. The library may modify the stop list with this option.

The online catalog will allow the user to view the authority files. The user first selects the authority file (author, subject, or added entry) and then gives the entry at which to begin the listing. For example, the user may select an author search beginning with "Hemingway." All author entries beginning with the Hemingway entry will be listed. The user may page down through the list but cannot page back. The user may enter the full name or partial name. Unfortunately, if the name is spelled incorrectly, the system will not display a name similar to the misspelled entry.

The "Boolean Search" option allows the user to search fields using right-truncated words and phrases, imbedded phrase (i.e. phrases using both left and right truncation), and keywords. In addition to the indexed fields (author, title, subject, call number, series, and added entry), the following non-indexed fields can be searched: receive date, edition, ISBN/ISSN, location, publisher, notes, type, and year.

The OPAC allows some relatively complex searches to be conducted. For example, the user can create up to four search requests, each linking up to three fields with two Boolean operators. The Booleans "and," "or," and "not" and the arithmetic operators "<," ">," and "=" may be used. A typical search might look like: "su=geo? and ye>1980." (The "?"

indicates right truncation). In this example the OPAC is requested to find all items whose subject field includes subjects beginning with "geo" and were also published after 1980. The system responds with the number of items that matched the requested search. The user may then edit the search request, combine search lines, or view the results. The titles matched may be viewed in either a long or short cataloging format and may be sorted on three fields. The search results can be saved in a text file on disk or sent to a printer.

The Boolean search screen lists the two-character abbreviations for the searchable fields at the bottom of the screen. It also lists the "indicators" used when searching. The system requires the user to designate truncation with a "?," and keyword or substring searching with a "\$". The "*" indicator tells the program to display the number of items matched for non-indexed fields. The default is for the system to display the number of matches on indexed fields only.

If a search is unsuccessful, the user may elect to edit the search or combine it with a previous search using the Boolean operators. Four combined searches in addition to the original four searches are allowed. The results of a search may be displayed in either the short (abbreviated) or long (complete) formats and printed or downloaded to disk. The user may elect to sort the records on one to three keys. If the records are downloaded to disk, they are stored in a text file which may be edited using a word processor. The Boolean Search does not display the circulation status of an item when both the circulation and catalog modules are used. The Online Catalog does.

The Universal Searching Module (USM) has recently been released for library use. It allows searching on all fields for any word or combination of words. Keywords can be searched simultaneously in the five or more most-used fields of a record. The USM supports right and left truncation and wildcard searching. The user can decide which fields to include and DTI will customize the software. Records may be displayed in short, medium, long, and MARC formats or the library can have DTI customize the display. Powerful sorting (both ascending and descending) will be available and it will be possible to browse the authority files, review search results on the monitor, or send results to a printer or disk.

The Catalog Module can print a new acquisition list by title, author, subject heading, or call number. The system allows the user to pick a beginning date for the list. It will then print out all acquisitions since that date. The list may be limited by the type of field in the bibliographic record. A shelflist may be printed or downloaded to disk. It may be limited by call number range, and it can also be qualified by the type field in the item record.

The Catalog Module can print complete catalogs by author, title, subject, series, and added entry. As with the shelflist, the user can print a complete or partial catalog, beginning and ending at any point in the database. Catalogs can be stored in a text file on disk. Listings of cross references and authority files may be stored on disk or sent to the printer. The system also prints catalog cards, and book and spine labels. Data Trek is one of the few vendors that supports searching the OPAC from remote locations via a dial-up connection. Obviously, the library would have to purchase a modem and additional telecommunications software.

Circulation

The Circulation module is basically menu-driven and handles all the basics: check-out, check-in, renewals, reserves, fines, overdues, reports, and inventory. The default access to a patron is through his/her name. This may be changed in the setup menu to use the patron's ID (barcode) number as the default access method to facilitate the use of barcodes and bar wands. If the default access is through ID number, entry of patron and item information may be done by wandling barcodes or by entering the ID numbers at the keyboard. A simple keystroke will temporarily switch the system back to access by name to allow the library to make transactions using the patron's name.

ID numbers for both the patron and item may be either system-assigned or user-assigned. If system-assigned, the system will keep track of the last number used and automatically assign the next number when adding patrons or items. User-assigned numbers allow the library to use alphabetic characters in the ID numbers. A library could choose to begin the item barcodes with an alphabetic code which would distinguish its collection from another library's using the same barcodes. It also allows use of social security card numbers.

The circulation module allows the user to search for a borrowers record by full or truncated name or ID number. In a name search, the system will print the names that come closest to the name entered. In a truncated ID search, the system will print all ID numbers beginning with that sequence. The user can select one of the patrons listed, scroll forward and backward through the list, or exit.

The borrower record consists of most of the fields in the patron record, including the number of items borrowed and the amount of fines due. It will warn staff if the patron has overdue items or when other limits are exceeded. The circulation module also has a "Find" option that allows the user to search on four indexed fields: patron, title ID number, author, and if the library has the catalog module, by keyword. This option includes only patrons who have items checked out.

For a patron search, if a truncated name or ID is entered, the system will respond with ID numbers or names that are close to the item entered. Staff can then select one of the entries listed or continue with another search method. The record displayed includes the patron name, titles, and ID numbers of items checked out, due dates on those items, hold, and overdue information.

A title search allows the user to enter a complete title or the first words of a title. Like the author search, if the exact entry is not found, similar entries in the authority file are listed and the user may select one. The displayed record is an abbreviated title record which includes—if the item is checked out—the name of the borrower, and date due. The title ID and author searches are similar to the title search and display the same abbreviated title record. The Boolean Search option on the Find menu functions much the same as Boolean searching in the catalog. It differs in that it searches on the fields available in the item record rather than the full bibliographic record.

The patron record includes fields for borrower ID, name, address (four lines available), city, state, zip, country, phone, account, borrower type, borrower status, card expiration date, comments, letter salutation, patron title, trap message, dependents, date record added, card expiration date, last transaction date, number of items borrowed, number of items renewed, and fines. The system allows the library to enter a second address for the patron and note whether the first or second address is to be used for the mailing of notices. Field names can be changed to suit the library. There are no user-definable fields.

At check-in, the system traps expired cards (optional), outstanding fines (optional), overdue items, items on reserve, items not in the database, and items not checked out. When it traps an item on a reserve queue it will automatically queue up a reserve notice to be sent.

At check-out it will trap a patron if he/she has overdue items, owes fines, already has the maximum number of items checked-out, or does not have a valid card. If the borrower is not in the database it will automatically list similar names. If none is selected, the staff has the option to add the patron to the database. The system will also indicate if an item is on reserve, is listed as already checked-out, or is a non-circulating item. Staff may override any of these traps.

A date due slip may be printed automatically at check-out. Loan periods may be in terms of days or months. Due dates (based on item and patron type) may be assigned automatically or the default due dates can be overridden by staff. The due dates are set with consideration of days the library is closed. The library can mark Saturday and/or Sunday as closed days and also enter up to 36 closed holidays. If a library is consistently closed on a day or days other than the weekend, those days would have to be entered individually as holidays.

The system allows grace periods. Fines are accrued beginning the first day after the grace period expires. Items may be renewed for the length of the original loan period. Renewal requires knowing the item ID number which can be determined using the Find Option. This facilitates renewal by phone.

As stated earlier, traps are set at both check-in and check-out if an item has a reserve on it. A queue is formed for an item with one or more reserves on it and this queue may be sorted. Reserve/hold notices are printed in batch or individually and a time limit on holds may be set. The system will print recall notices.

Fine rates may be assigned to different item types. A default fine rate may also be assigned. Once an item is checked in, only the total amount due is kept in the system. A record of fines due by title is not kept. Partial payments are allowed. Fines may also be edited or excused. A listing of a patron's fines is easily generated. Staff can declare an item lost or missing and assess a fee.

Up to three overdue notices (including an optional billing notice) can be printed and sorted according to the library's specifications. The notices are printed in either letter or postcard format.

The Circulation module can print barcode labels and Roladex cards. The system generated barcode labels are to be used for backup purposes only. Data Trek recommends that libraries purchase photo-composed, laminated Code 39 barcode labels for everyday use.

Inventory can be taken with a portable bar wand and downloaded into a text file on disk. The user may also enter the item ID numbers into a file using the keyboard. This file is then compared to the database and a statistical report is generated. The report includes the number of items missing, number of items currently checked out, and the number of items on the shelf but not in the database. Reports can be printed of the ID numbers of the items on the shelf but not in the database and the ID number, call number, and title of each item missing.

The Circulation module can generate over 100 reports which include

- usage report by item number,
- usage report by call number range,
- usage figures on different materials,
- current week and month usage figures,
- monthly usage figures,
- total usage to date,
- usage by item type,
- usage by account, and
- usage by borrower type.

The account field in the patron record could be used to designate where a patron lives (political subdivision). Because the system is able to print out usage by account, libraries could track usage by people living outside of the library's own political subdivision.

System Attributes. Card Datalog provides a type-ahead buffer. If the user knows the sequence of keys to press to access a certain function through a series of menus, he/she may enter that sequence without waiting for the menus to appear. For example, to print out the "Usage by Account Report" the user may enter "73C" which will select "7" from the first menu, "3" from the second, and option "C" from the last.

Context sensitive help screens are available by pressing the F1 key. These screens in the public access catalog are easily customized by the library. The librarian may program the function keys to do up to 30 often-repeated actions. A simple press of a function key will do what may have required stepping through several layers of menus.

The Boolean searching in both the catalog and circulation modules is powerful but aimed at the expert user accustomed to the (field name = variable operator or field name =

variable) specific procedures that must be used. The help messages in this option, unfortunately, are not directed at the beginning user.

Networking. The system runs on IBM-compatible microcomputers and local area networks supporting the MS-DOS and PC-DOS operating systems. Data Trek is an authorized distributor for Novell, 3COM, and Banyan LANS.

Backup and System Security. The backup utility, accessed from the main menu, allows transferring of data from the computer's hard disk to floppy disks, removable tape cartridges, streaming tapes, or additional hard disks. The user must use the DOS utilities to backup to tape or the software provided with the tape unit. Security is provided by assigning passwords to functions within modules.

Hardware/Software Requirements and Costs

As a turnkey vendor, Data Trek can supply both hardware and software and will profile a library to determine its hardware needs. The cost of the circulation and catalog modules are \$2,450 each for collections under 65,000 and \$4,995 each for collections of 65,000 and over. The Databridge and Universal Search modules are \$995 and other modules are \$2,450 each. Multi-site and school discounts are available.

The system will run on all Apple Macintosh computers, IBM (including PS/2's) and compatibles using MS-DOS or PC-DOS, and DEC VAX minicomputers using VMS 4.7 or greater. Minimum RAM required is 640K. DTI will profile the library's needs to determine what size hard disk is required.

Vendor Support. Data Trek has been in the microcomputer library automation industry since 1981. Because this industry is relatively new, this makes Data Trek one of the older, more established vendors. Library automation is their only business, and they have installed more than 1,500 systems.

Data Trek's products are covered by a 90-day warranty which includes free phone support. The library may purchase support contracts for further coverage after the warranty expires. Most software support contracts are priced at \$500 per year, per module and entitle the user to 15 hours of telephone support per year and includes enhancement releases one to two times annually. Hardware maintenance contract terms vary.

Also included in the software support is electronic mail access 24 hours a day, user groups, and a newsletter. Toll-free phone support is available Monday through Friday, 6 a.m. to 6 p.m. (Pacific Time). Weekend support may be purchased at an additional fee. Remote troubleshooting can be conducted by Data Trek staff if the library purchases a modem and additional telecommunications software. On-site training is available at \$350 per day plus expenses. With a turnkey purchase of both software and hardware, much of the configuration is free.

Miscellaneous. Data Trek is currently developing two new systems, one for the Digital VAX minicomputer line, and another for the Apple Macintosh computer line. The library's entire catalog may be put in one database or may be divided into separate catalogs.

Chapter 12

Follett

The Follett Software Company (FSC) markets a wide range of library software products. Circulation Plus and Catalog Plus are integrated modules which may be purchased separately. They are designed to work in conjunction with several other Follett products, including Quick Card, Textbook Plus, and Portable Scan Plus. Versions of Circulation Plus are available for both Apple II and MS-DOS equipment; Catalog Plus operates on MS-DOS equipment only. The versions demonstrated were for IBM and compatible (MS-DOS) microcomputers. Catalog Plus will only work with version 7.0 or later of Circulation Plus. Both the newer version of Circulation Plus and Catalog Plus are written in "C."

Follett claims the system can handle up to 130,000 item records. Currently the largest database contains 65,000 item records. The greatest number of stations on a local area network is currently nine. The highest annual circulation on a system using only Circulation Plus is over 250,000.

Product:	Circulation Plus, Catalog Plus
Version:	Circulation Plus version 7.0, Catalog Plus version 1.0
Company:	The Follett Software Company
Address:	809 North Front Street McHenry, IL 60050-5589
Phone:	(800) 323-3397
Fax:	(815) 344-8774

Database Issues

The Follett system stores a full cataloging record in MicroLIF format. The database contains a master bibliographic record for each unique title with item records attached to it for circulation purposes.

Follett will download records to floppy disk from a MARC tape (Database Creation). Follett suggests that a library have the full MARC record downloaded to floppy disk even if the library is only purchasing Circulation Plus. Circulation Plus will load only selected tags of the MARC record from the floppy disks and can maintain only those fields. If the library decides to implement the full catalog in the future, the full records for the original database will be on the original floppy disks created by Follett, they could then be loaded into the system.

The Circulation Plus short records include the LCCN and space for multiple ISBN's. Some libraries are using the LCCN entered in this field as a match to obtain full MARC records from a MARC database. This record upgrade is a service that Follett offers to their users of Circulation Plus. The full MARC records are then loaded into Catalog Plus.

Database Creation. Follett will take a nine-track magnetic tape and download MARC records from the tape onto floppy diskettes in MicroLIF format. There is an initial setup fee of \$350.00 plus 5¢ per record. They also accept records from BiblioFile, MITINET/marc, OCLC, and WLN. Follett has a CO-ROM conversion product called "Alliance Plus" which has LC MARC records and other records often used by school libraries.

Ongoing Conversion and Database Maintenance. Follett's system will accept MARC records from BiblioFile, MITINET/marc, and OCLC, WLN. It will also accept MicroLIF

records on floppy diskette from Follett, Baker, and Taylor and other book jobbers and vendors.

The system also provides for manually keying in full cataloging (MicroLIF) records into the database. The entry screen displays both tags and labels. The system will not allow the cataloger to add an incorrect tag or subfield code. Error checking is done at the tag and subfield level rather than after the entire record is added. Global editing is not currently supported, but Follett plans to add this capability. Records may be added immediately to the database or saved on a floppy disk and added at a later time in a batch mode. Currently there is no provision for authority control.

Record Output. Records may be output to floppy disk in both MicroLIF and MARC Communications format. If any changes are made to the record after it was initially loaded, the changes will be reflected in the MARC directory.

Online Public Access Catalog

Catalog Plus is Follett's online public access catalog and incorporates its catalog maintenance module. Catalog Plus allows searching by title, author, call number, LCCN, ISBN, subject, and series. This is not keyword searching because the user must know at least the first word in a title (or other field) rather than any key word. Indexes may be browsed by the patron. Keyword searching is available in title, author, note, and subject fields. The Boolean operators, "AND," "OR," and "NOT," are also supported. It is possible to restrict searches by reading level, interest level, and publication date.

The user can specify if a word to be searched is part of the author, title, subject, or series. Patrons can enter words in more than one field as part of a single search and searches may be qualified by "category" using the Boolean operators (categories are explained below). Right truncation and wild card searching can also be done.

Depending on the type of search entered, there are different data displayed for multiple records matching the search request. For example when entering an author, all titles held by that author appear along with the call number. When entering a keyword search the title appears, date of publication, and the number of times the keyword appears in each cataloging record. In keyword searching, the call number only appears if the user specifically requests that the complete cataloging record be displayed. There are very few instructions on the screen but by pressing "F1" context sensitive help is readily available.

The system will display records in more than one format including a MARC-tagged display. If used with Circulation Plus, the OPAC gives circulation information, including a list of the copies available or, if they are all checked out, the first copy that is due back and the due date. The user can print bibliographies in either a long or short record format sorted by author, title, and call number. The catalog has a default stop list. Currently it cannot be modified by the library.

Volumes may be assigned to "categories." The library can set up 2,000 different categories and each item may be assigned to up to eight of them. Categories are user-defined and can be used for subject, physical descriptions, specially funded items, or anything else the library wishes to track or list. Boolean operators are supported so items may be found by combining categories.

As an example of how this might work, the library could set up categories for material type (book, video, cassette tape, etc.), interest level (adult, young adult, child, etc.), and special themes (Christmas, Bike Safety, etc.). The library could print out lists of all items in the collection pertaining to Christmas, Christmas videos, or Christmas videos for children. Category designations may be added to item records in batch by using a bar wand. For example, a group of books could be assembled for a suggested summer reading list and easily entered into the new category.

Circulation

MARC tag	Field name
010	LCCN
020	ISBN
100's	Main entry: Personal name
245	Title
260	Publication
900	Local call number
901	Local barcode number
903	Price
909	Categories
910	Circulation period
940	Reading/Interest level

The circulation item record includes selected tags from the MicroLIF record, as shown in the above figure.

Circulation Plus is menu-driven. Menu items are listed across the top of the screen and are selected using the function keys. Circulation Plus lets the user know where he/she is in the menu system by drawing an index card on the screen for each selection. Appleworks users will be familiar with the format.

The system utilizes barcode scanners and barcodes to enter material and patron information. If the barcodes are unavailable, staff may enter the barcode number manually through the keyboard. The system has a barcode range of one to 9,999,999 and supports Code 39, Interleave 2 of 5, Labelcode 4, Labelcode 5, and Codabar. Follett can provide barcode labels and the system will print single replacement barcodes. Follett assigns a range of barcode numbers (up to 999) to be assigned to temporary circulating items such as pamphlets. In version 7.0, any number may be a temporary number.

The patron record includes two ten-character user-definable fields. It also includes two special location fields. Scanning the patron's barcode produces the patron record. It lists items checked out, items overdue, and fines due. Scanning the item barcode gives the title and date due. From within circulation, staff can browse titles, get circulation information, and browse patron files. To find a patron's name, staff need only enter the first few letters of the patron's last name.

Searching can be done by title, author, patron, and call number. The system supports the usual traps at check-in (hold for reserve) and check-out (overdue items, owes fines, maximum items checked out, expired registration) which can be overridden by authorized staff.

Circulation Plus allows for 23 different loan periods. The system assigns each item to one of the loan periods. Due dates are automatically calculated adjusting for the days the library is not open. Authorized staff may override the default due date. Staff can renew items by phone by entering either the barcode numbers or the patron name and item title through the keyboard. Circulation Plus allows the library to set renewal periods that are different from the original loan period.

Reserves are placed at the title level. A user receives the next available copy rather than waiting for a specific copy to be returned. The circulation program allows a limit to be placed on the number of holds on a particular title. If the last copy of a title has been checked out from the collection, the system will alert the staff if there are reserves outstanding. The reserve queue is in the order in which the requests were made; staff cannot rearrange it.

Fines are based on the loan period in the item record. The system retains the fine or cost per item, in addition to the total amount due and allows partial payments. Staff may easily call up and review a patron's outstanding fines. Staff may declare an item missing and enter a fee into the patron's fine record.

Circulation Plus allows for 23 different grace periods which correspond to the 23 possible loan periods. Circulation Plus produces overdue notices, bills for lost or damaged items, reserve notices, and expired card notices. The program automatically generates at least three overdue notices at dates specified by the library. The notices are addressed for windowed envelopes.

Circulation Plus can provide daily, monthly, and yearly statistics. Some examples include: total items checked out, total items checked out by material type, number of circulations by classification, number of times an item has circulated, last date circulated for a particular item, last date circulated for any copy (item) of a particular title, total number of times all copies of a title have circulated, and items which have never circulated. Tracking the number of circulations by the political subdivision can be done using a special location field.

Patron reports include (but are not limited to): patron lists by patron category, number of items currently checked out, total number of items checked out in a given time period, and date of card expiration. The system will also print lists of patrons with overdue items, of items which have holds on them, and items that have been reported as lost or missing.

Follett markets a portable hand-held device, PHD+, and software, Portable Scan Plus, which can be used to take inventory, temporarily check items in and out, and place orders with the Follett Library Book Company. The Inventory option of Portable Scan Plus will check for properly shelved items and will print reports listing items and status of items, for example, "on shelf," "checked out," or "missing." PHD+ with Portable Scan Plus can be used as a temporary check-in/out station if the circulation system is down. The records are stored and can be uploaded later after Circulation Plus again becomes operational.

System Attributes. Both Circulation Plus and Catalog Plus are easy to navigate and provide clear, uncluttered screens and provide context-sensitive help screens throughout the search. The addition of keyword searching makes it possible for patrons to find titles and subjects when the exact title or subject heading is unknown.

Networking. Follett has its own network, PlusLink, which is a variation of the Corvus local area network. Currently it can network only six stations (not including the file server). Follett is in the process of making its automated system compatible with the Novell network. Librarians should ask Follett representatives for the latest information on network options.

Backup and System Security. Security is maintained through passwords for the functions. The circulation system may be set up to automatically back up circulation transactions to disk at a period set by the library. The system includes a command to back up the entire circulation system to floppy disks. Follett suggests backing up the data for Catalog Plus to a streaming tape. However, at the time of the review Follett had no "restore" program. In other words, the user could use a streaming tape to back up data but if he/she ever had to use that data, he/she would have to work with a third-party vendor to somehow get the data back onto the hard disk! The PHD+ portable scanning device with Portable Scan Plus software can check books in or out. This could be a backup to the circulation system when it is not functioning.

Hardware/Software Requirements and Costs

Circulation Plus will operate on IBM PC/XT/AT or compatibles (8MHz minimum processor speed), with at least one floppy drive and a hard drive with a disk access of 30ms or less. For networked versions of Circulation Plus and Catalog Plus, the recommended file server is an IBM AT or compatible, PS/2 Models 60 or 80, or a Tandy Model 4000LX or 5000MC. A remote station could be an IBM PC, XT286, PS/2 Model 25, PS/2 Model 30, or Tandy 100SX, 1000SL, 1000TX, 1000TL, or 12000. Remote stations do not need hard drives. The file server will need hard disk storage of approximately 2MB per 1000 titles plus 10MB for programs and other related data. Disk access should be 28-30ms or less. The file server must have at least 3MB RAM and each remote station needs 640K RAM. A streaming tape backup is highly recommended. When Circulation Plus and Catalog Plus are networked, Follett recommends that the file server be dedicated (that is, not used for circulation or searching purposes). The file server could be used as a catalog maintenance station.

The Circulation Plus package costs \$1245, which includes software, one year of support, barcode scanner, barcode scanner interface card, training, and installation. Catalog Plus costs \$1,095 and also includes one year of support. Training for Catalog Plus is available on a bid basis. Support after first year is \$100 for Circulation Plus and \$150 for Catalog Plus. Support includes upgrades, toll free phone support, a newsletter, and membership in a users' group. A PHD+ complete package which will perform acquisitions, inventory, and circulation is \$950.

Vendor Support. Unlimited technical toll free phone support is available from 7 a.m. to 6 p.m. central time Monday through Friday. Follett has been marketing library automation software for six years. Its parent company, Follett Corporation, has been in business for over 100 years.

Chapter 13

Library Automation Products

The Assistant is a microcomputer-based library automation system created for the small-to-medium-sized library. The software is written in the "C" programming language and is composed of four modules: cataloging/online catalog, circulation, serials control, and acquisitions/fund accounting. Library Automation Products (LAP) also sells a MARC Exchange module which will import data from several systems and vendors. With the exception of circulation, the modules may be purchased and used as stand-alone programs. The circulation module relies on the catalog module to add and maintain full records. If a library wants to automate circulation, it must also purchase the catalog module. (The catalog module may be used without the circulation module.) This summary discusses the circulation, catalog, and MARC Exchange modules.

The Assistant was developed initially for special libraries and, at present, is not installed in any public libraries. LAP claims the database limit to dependent on the size of the hard disk. Currently its largest installation contains about 50,000 records. This location is in an academic library with 30 to 40 networked terminals. The highest annual circulation on a system running The Assistant is 15,000 to 20,000 items.

The Assistant has the capability to create a union catalog at each site. If a user finds an item in the public access catalog which is not available in his/her library, the system immediately proposes other libraries in the union which house the material. Materials may be independently cataloged by several libraries and the bibliographic data merged or they may be cataloged at a central site.

Product:	The Assistant
Version:	Circulation 4.0, Catalog 4.0
Company:	Library Automation Products
Address:	352 7th Ave., Suite 1001 New York, NY 10001
Phone:	(212) 967-5418
Fax:	(212) 967-5457

Database Issues

The bibliographic database contains a single master record for each title with item records linked to it for circulation purposes. An unlimited number of item records may be attached to a single master title record. The library cannot select which cataloging fields to index. The cataloging record is not in the MARC or MicroLIF format but is in a format defined by the vendor.

Database Creation. Library Automation Products can download MARC records from a nine-track magnetic to floppies to create the initial database. The cost for this process is \$500 plus 10¢ per record. The MARC Exchange module will convert OCLC, RLIN, and MARCIVE records to the format used in The Assistant. LAP has an interface with BiblioFile.

Ongoing Conversion and Database Maintenance. The system accepts MicroLIF records from floppy disk as a form of input using the MARC Exchange module. It will accept screen saves from OCLC, RLIN, and MARCIVE. Original cataloging (additions, changes, and deletions) can be accomplished using the Masterfile Maintenance option of the catalog module. Author, subject, and series authority files exist to standardize cataloging and

searching. Maintenance of these files includes "see" and "see also" references and global change capability.

When adding cataloging information in a field subject to authority control, the system displays the authority file on the right side of the entry screen and allows the cataloger to browse the file. If the correct entry is found, the cataloger can select and insert the information directly into the record without retyping it. If the correct entry is not found, The Assistant will add the new entry to the authority file. The initial authority files can be created when the database is initially loaded. If the system is being used for central cataloging for a union catalog, it will automatically display the library names and allow the cataloger to choose the locations to add to the holdings field. Cataloged records may be added in batch or online. In either case, records are available immediately to the user. The catalog module produces catalog cards, and book and spine labels. It also generates acquisition lists by date range or by library if central cataloging is used. It will also produce a shelf listing, subject listing, and catalogs arranged by title, author, subject, or tracing.

Record Output. The system can download records to a floppy disk. The vendor describes the format as a "MicroLIF derivative." LAP is developing a program to download records in the MARC format.

Online Public Access Catalog

The online public access catalog allows searching by call number, title, author, subject, and series fields. Keyword searching is possible on author, title, subject, notes, and series. Global keyword searching will search these five fields simultaneously. The system supports the Boolean operators "AND," "OR," and "NOT," and automatic right truncation. It can also limit a search by date of publication or by location.

If the result of a search matches only one title, the system will automatically display the full cataloging information for that title. If there are several titles that match the search, brief cataloging information is displayed. The user can then select the specific title using the cursor keys and the full record will be displayed. Pressing the "page down" key causes the item level record to be displayed. Included with this information is the current circulation status. If the item is checked out, the date due is displayed. The user may elect to save the cataloging records displayed to a file and print out a listing later. The records can also be printed as they are viewed on the screen.

The public access catalog is, by default, menu-driven, but the experienced searcher may, by pressing a function key, switch to command-line searching. Searching in this mode is similar to online databases, such as DIALOG and BRS, where the user enters a mnemonic for the field, the entry for that field, and explicit boolean operators. For example: "(A) Steinbeck & (T) Grapes" will search for *The Grapes of Wrath* by John Steinbeck. The system has a predefined stop word list. The catalog module of The Assistant produces bibliographies sorted by author or subject.

Circulation

The circulation module functions include loans, returns, reserves, holds, and fines. The system uses barwands and barcodes (Code 39, Codabar, and others) to check items in and out. If the patron does not have his/her ID card or does not know his/her ID (barcode) number, the patron file is easily displayed by pressing a function key. Staff may then scan the file and select the appropriate patron's name. Similarly, if an item's barcode is damaged or missing, the barcode number may be found by entering the first few letters of the title. This versatility allows items to be renewed by phone without the material or patron ID card in hand.

The fields in the patron record are:

Patron ID	15 characters	Telephone	13
Last Name	25	Secondary Addr1.	30
First Name	25	Secondary Addr2.	35
Patron Type	2	Telephone	13
Primary Addr.	50	SSN #/Corp. #	20
City	20	Date Entered	6
State	2	Date Expired	6
Country	2	Maximum Items Out	
Zip Code	9	Delinquent	Y/N
		Comment	60

At check-out the system alerts staff if the patron has outstanding fines or overdues, has the maximum number of items already checked out, or has an expired card. Staff may override these traps. Loan periods are determined by patron type, and material type but staff may override the default loan period. Due dates are calculated, adjusting for the days the library is closed. The system setup allows the library to enter closed days into a calendar. The library may define the calendar several months or years in advance.

The system does not print date due slips and there are no grace periods. It does generate an overdue notice which contains a note field which may be customized by the library. When demonstrated, The Assistant did not have a renewal function, an item had to be checked in and then checked out again. The representative claims that the system now has a renewal function.

A fine table, set up by the library, determines the fine rate for an item. Fields in the fine table include material type, patron type, loan period, fine rate, and fine period (for example, by hour or by day). Staff may display a patron's fine record, which includes the titles of those items overdue and the individual amounts due. Partial payments are accepted and may be applied to a particular title. Staff may declare an item lost or missing and may post a lost or missing "fine" in the patron's fine record.

The system easily displays circulation status by borrower and by title. The borrower display lists all books checked out to the patron, the date each was checked out, and the date due. The title display lists all copies checked out with borrower information and date due.

The system will alert staff at check-in if an item has a hold on it. Items may be reserved by title, call number, or barcode number. There is no maximum number of holds per item. Staff may access the reserve queue by title, call number, or barcode number and may rearrange the reserve queue. The system does not print hold or hold cancellation notices.

Inventory may be taken using portable barwands. The staff can specify the scope of inventory by specifying the starting and ending call numbers. Circulation reports include annual and monthly circulation, usage, patron lists, overdue notices, overdue reports, and status reports (available, checked out, being processed, course reserve, on order, non-circulating, reported lost, withdrawn, and missing). Because there are an unlimited number of patron types available, the library could assign (besides the customary adult, children, etc.) political subdivision "types" to keep track of circulation. The system could then print out the number of circulations by a particular city, town or village.

System Attributes. The Assistant has a user interface that is clear and easy to understand. The program is menu-driven and allows selection by highlighting items using the cursor keys and pressing "RETURN" or "ENTER." Context-sensitive help screens are available by pressing the F1 function key at any point in the program.

In the public access catalog, as the user passes through a menu the system draws an "index card" on the screen labeled with the menu title. The trail of index cards reminds the user where he/she is in the program.

Networking. The Assistant can support a multi-user system using Novell, Banyan, or 3COM local area networks. It can support up to as many workstations as allowed by the network. The largest networked system currently in use is between 30 and 40 workstations. LAP, Inc., is a value added dealer for Novell.

Backup and System Security. Staff are assigned low, medium, or high security clearance through passwords. There is no built-in function for backing up the system. The library could use the backup functions available in DOS or purchase other back-up software commercially available. LAP recommends libraries purchase an external tape back-up unit.

Hardware/Software Requirements and Costs

The Assistant will run on all IBM PC/AT, PS2 series and compatible equipment with a minimum of 640K RAM, hard disk, monochrome, or color monitor. Also suggested are a barcode reader, 2400bps Hayes compatible modem for remote diagnostics or searching, external tape back-up unit, dot matrix printer (Epson, Epson compatible, Okidata or IBM Proprinter XL), a power surge suppressor and, for larger systems, an uninterrupted battery back-up power supply unit. Laser printers (e.g. HP LaserJet) are also supported. In addition to the several printers it supports, The Assistant allows the library to add custom printers. In addition to the software modules the library desires, the library must have DOS 2.0 or later, and telecommunications software if the library wants remote access. Each software module from LAP costs \$2300 for the single-user version, \$2,800 for the multi-user version. The MARC Exchange module is \$1000. Contact LAP for educational discounted prices.

Vendor Support. Library Automation Products, which has been in existence for about three years, is a subsidiary of Management Information Systems (MIS). Together they can provide both hardware and software. There is a free 90-day maintenance period. After that, the annual maintenance fee for each module is \$350 for the single-user version and \$400 for the multi-user. The maintenance agreement includes upgrades, toll-free phone support, remote diagnostics done by modem, and a newsletter. Currently there are users groups for academic and special libraries but none for public libraries. LAP will provide training on-site or at the New York City office. The cost of the on-site training is \$100 an hour (8 hour minimum) plus expenses. If Management Information Systems supplies the hardware, they will supply backup hardware in the event of failure.

Chapter 14

Library Corporation

The Library Corporation's BiblioFile Library Tools differ from the other systems demonstrated as it is with the exception of the circulation module, CD-ROM-based. Currently BiblioFile consists of Acquisitions, Circulation, Cataloging, Intelligent Catalog, and BiblioFile Catalog (BibCat). Only BiblioFile Circulation and the Intelligent Catalog were demonstrated, but this summary will also briefly discuss Cataloging and BiblioFile Catalog (BibCat).

The Intelligent Catalog is a CD-ROM-based online public access catalog (OPAC). For a single CD-ROM drive system, the average number of titles supported is 500,000. This figure can vary and may be higher or lower depending on the length of the records stored. For a multiple CD-ROM system, 1.2 million titles is an average maximum number of titles currently supported. Each individual OPAC stand-alone station has its own copy of the library's catalog on a CD and its own copy of the OPAC software to search the catalog. They are not networked together in a LAN.

Product:	BiblioFile Circulation The Intelligent Catalog
Version:	Circulation 1.25 Intelligent Catalog 2.20
Company:	The Library Corporation
Address:	P.O. Box 40035 Washington, D.C. 20016
Phone:	(800) 624-0559

Database Issues

The Circulation system contains short item records. The Intelligent Catalog contains the master title records. The databases are separate: the circulation item records are stored on a hard disk on the circulation file server and the master title records are stored on compact laser disks in each of the Intelligent Catalog stations. The Intelligent Catalog can store and display a full MARC record. The library determines which fields in the item and title records are to be indexed.

Database Creation. The Library Corporation will take a nine-track magnetic tape of MARC records and master the original CD for The Intelligent Catalog for .035¢ per record. They will accept local MARC files from other sources including OCLC, WLN, Ultras, RLIN, Brodart, GRC, WISCAT, and others.

Alternatively, if the library's holdings are not in machine-readable form, BiblioFile Cataloging could be used to do retrospective conversion. BiblioFile Cataloging uses the LC MARC database on CD-ROM (and other databases at extra cost) and allows the library to locate MARC records and download them to floppy disks for use in the Intelligent Catalog and other vendors' systems, including WISCAT if the BiblioFile/WISCAT interface is used.

Ongoing Conversion and Database Maintenance. Maintenance of circulation and patron records is accomplished using BiblioFile Circulation and is discussed under "Circulation." The Intelligent Catalog software does not have the capability to add or

maintain the bibliographic records. Additions, modifications, and deletions are made to a hard disk using BiblioFile Cataloging.

The records on the hard disk are logically interfiled with the information on the CD in the Intelligent Catalog. This is done monthly by The Library Corporation, but arrangements can be made for more frequent updates for an additional fee. When the hard disk is full, the CD is remastered. This arrangement allows the user to search for titles that are both on the hard disk and on the CD. The search process is transparent so the user is not aware of the source of the information.

There is a lag time between the time the record is added to the hard disk and the time it is interfiled with the information on the CD. The record is accessible using Cataloging during that period but is not accessible to the user searching the Intelligent Catalog. The software needed to do the interfiling is available to the library, and as such, the library may choose to do the interfiling on each station at more frequent intervals. This would mean more work on the library's part but would make the records available to the searcher sooner.

Record Output. BiblioFile Cataloging can output records in MARC format to floppy disk.

Online Public Access Catalog

The Library Corporation vendor demonstrated the Intelligent Catalog described here. The Library Corporation also markets BibCat, a less expensive online public access catalog.

The Intelligent Catalog is a multimedia public access catalog which combines text, graphics, sound, and verbal messages in a CD-ROM-based stand-alone station. The station itself consists of a PC-XT compatible computer with a removable hard disk, a 360K floppy disk drive, built-in CD-ROM drive with sound, graphics, clock/calendar, RS232 port (for connection to BiblioFile Circulation), and MS-DOS. The unit comes in a locking desk with power conditioners, cooling fan, tilt-base, amber monitor, silent printer, keyboard, speaker, earphones, and telephone handset. The keyboard is color coded and the keycaps are labeled to make searching easier for the user. Because each station has its own copy of the catalog on CD-ROM, there is no need to network the stations. As a result, the stations are not competing with each other and searching is generally very fast.

The initial menu lists five access paths which match yellow function keys on the keyboard. The paths are: Find Anything (a keyword search), View Catalog (browse the catalog alphabetically by author, title and/or subject), Browse Topics (browse in shelflist order, selected by classification), Locate on Map, and Get Advice. "Find Anything" is a keyword searching mechanism. The system asks "What would you like to find in the catalog?" The user responds with a partial word, a word, a phrase, or a sentence. As the user types, the authority list displays on the right. The system then determines what it is the user wants and searches for it. The system responds with the number of times the keywords occur in the catalog. The user may select from the list of keywords and join them with Booleans. The list of matching entries can then be displayed. By moving the cursor to a particular entry and pressing "RETURN" or "ENTER," the full record is displayed.

The catalog can display the record in several formats including full MARC. Records may be printed or saved to disk to be printed later in a bibliography. Bibliographies may be sorted by call number, date, author, or title. The system keeps a log of what the user has done and can display the log. It also allows the user to take notes for personal use or leave messages for the librarian.

The "View Catalog" option of the main menu allows the patron to browse the author, title, and subject indexes, similar to browsing a card catalog. The display lists the number of works in the catalog under each heading. The user may select a heading using the cursor keys and the system responds by listing all titles under that heading. The user may then select an individual title and view the full cataloging record. The "Limit Search" option of the main menu allows the user to limit searches by language, media type, year range, and

library if the database is a union catalog. The Intelligent Catalog maintains a stop word list which is not modifiable by the library.

By selecting "Locate On Map" from the main menu, the user can view and print maps of the library. These maps are initially drawn by the library and entered into the system by The Library Corporation. Another feature not found in the other systems is the "Get Advice" option. The system offers a series of questions with the intent of determining the user's preference in literature. Once it has established this preference it then suggests other authors and titles in the genre or subject that may appeal to the reader. The library may enter, store, and update a list of local events and notices in the system. This bulletin board is accessed through the "Local Information" key on the keyboard. The Intelligent Catalog can be linked to BiblioFile Circulation using built-in serial (RS-232) communications ports. If this is done, the Intelligent Catalog can display circulation status information.

The Library Corporation came out in 1989 with the BiblioFile Catalog (BibCat), another CD-ROM-based online public access catalog. This system was not demonstrated but the literature states that it consists of a small footprint PC microcomputer, an internal CD-ROM drive, audio output, and a standard floppy drive. A hard disk is necessary only if the library requires monthly updates.

BibCat uses the same search techniques as the Intelligent Catalog. It includes shelflist browsing, spoken help messages, and context sensitive help screens. MARC records can be saved and/or sorted before printing. Display formats included full labeled, card image, and full MARC. BibCat supports dial-in access from remote locations. In addition, it can be connected to BiblioFile Circulation to display circulation status.

Circulation

BiblioFile Circulation uses dual 286/386 computers operating in parallel under a DOS or UNIX environment supported by a network of distributed processors. Each station on the network contains its own records of patron and item information. These records are updated throughout the day with updated information from the central server at intervals set by the library. If the central server goes down temporarily, the individual stations may continue working.

The circulation system employs pull-down menus, context-sensitive help messages, and labeled function keys adding to its ease of use. Like the other systems reviewed, BiblioFile Circulation uses barcodes and barwands. Barcodes may also be entered manually. The usual traps are enforced at check-in and check-out (expired card, maximum number of loans exceeded, too many overdue or fines, reserve on item.) Staff may override these traps with proper authorization.

The system calculates loan periods (hours or days) according to patron type and circulation period. Due dates are automatically generated taking into consideration the days the library is closed, but may be overridden by authorized staff. The system can print date due slips. The library may allow grace periods.

BiblioFile Circulation can renew all items checked out to a patron in batch. The library may specify renewal periods different from the original loan period and can set a limit on the number of renewals. Phone renewals are also possible. BiblioFile Circulation automatically generates fines for overdue notices. Fines for individual items are stored in addition to the total fine due. Staff may accept partial payments, override, or adjust fines. Items may be listed as claimed returned, missing, or damaged. The system prints optional receipts for fines paid. Reserves may be placed on the first available copy or a particular copy of a title. The system can display the number of reserves on a title. There is no limit to the number of reserves that may be placed on a title. The reserve queue is basically in the order that the reserves are made, but priorities may be set by type of patron and patrons listed in the queue may be rearranged. One feature, not found in other systems, is the option to generate a phone call list for available reserves.

The library can specify a hold-time limit after which, if the item is not picked up, the system will remove the patron from the reserve queue. The library can also specify an expiration date for reserves. If the item is not found in the time allotted, the reserve is canceled and the patron notified. If an item is withdrawn from the collection, all reserves on that item are canceled and cancellation notices are generated.

The library has the option to recall items or change the due dates on them. Notices to the patron holding such items are generated. With the reshelving function, the library can record usage statistics on items used in-house but not checked out. At the end of the day staff could gather books in the reading area and wand them with the portable barwand reader.

To protect from charging out items to the wrong patron, the system employs automatic time-outs. After a period of inactivity, the screen reverts to the previous menu. Eventually, the screen will revert to the main menu if no activity occurs. The library determines the length of the time-out period.

System Attributes. Because The Library Corporation is a turnkey vendor, the hardware it provides is specifically designed for its software products. Keyboards are color-coded and labeled with the appropriate function. Pull-down menus, context-sensitive help screens, and audible messages all add to BiblioFile's ease of use. The Intelligent Catalog's keyword search "Find Anything" option allows the patron to enter a search with simple natural language, avoiding the rigid syntax of a few of the other systems.

Networking. The Intelligent Catalog is not networked via a formal local area network configuration. Communication with BiblioFile Circulation system is accomplished through built-in serial (RS232) ports. Multiple circulation stations may be networked.

Backup and System Security. As mentioned under Circulation, individual circulation stations have their own copies of item and patron information and can continue circulating materials if the server goes down. If a power failure occurs, check-in and check-out may continue using a portable bar code reader.

BiblioFile has an extensive security system. There are two levels of employee access security. Level 1 access allows any employee to log in and perform most circulation functions. Staff must enter a supervisory password to access restricted functions. Level 2 assigns each individual staff member a barcode and password and keeps a list of which functions that employee has permission to access. The password to override automatic system blocks (expired patron card, for example) is separate from the two levels mentioned above. The system administrator determines who has access to the password and may change it as needed to protect security.

Hardware/Software Requirements and Costs

The Library Corporation is a turnkey vendor. The cost for complete Intelligent Catalog station is \$2,970. In addition, there is a yearly fee of \$495 per station which includes monthly recumulation of the catalog, toll-free phone support, replacement of component parts via courier, software enhancements, and remastering of the CD-ROM as needed. BiblioFile Circulation (without hardware) is \$3,500 plus a yearly support fee of \$380 per computer. Note that this differs from the other systems which charge a flat support fee per library, not per computer. The hardware for Intelligent Catalog must be bought from The Library Corporation and the cost is included in the fee stated above. A library may purchase its own hardware for BiblioFile Circulation.

BibCat requires a PC compatible computer with 640K RAM and a Hitachi CD-ROM drive. The library can provide its own hardware or purchase the hardware from The Library Corporation. A complete unit including the PC with 640K RAM, a 360K floppy drive, built

in Hitachi CD-ROM drive, keyboard and monitor is \$1,250. An optional 40 MB fixed hard disk for monthly updates is \$420. Support on each BibCat station supplied by The Library Corporation is \$150 per year per station.

Software for BibCat is \$195 with an annual support fee of \$195 which includes new software releases, toll-free support, and the first catalog each year. For an additional \$150, the Library Corporation provides 11 monthly updates of the catalog. There is no fee for the initial mastering of a clean MARC file of up to 500,000 titles. There is an extra charge for eliminating duplicate records, or other data manipulations. If the library has The Intelligent Catalog, extra Intelligent Catalog discs for BibCat are included in the support fee.

BiblioFile Cataloging requires an MS-DOS compatible PC with a minimum of 640K RAM, a 20 MB (or larger) hard disk drive, one floppy drive, and at least one CD ROM drive. The cost for the Cataloging software, the complete LC MARC English cataloging on CD-ROM laser discs, and installation support is a \$2,250 one time fee. Subscriptions are available for the LC MARC English Disc, LC MARC Foreign Disc, Sears/Dewey MARC Cataloging Disc, Contributed MARC Cataloging Disc, and University Catalogs. The LC MARC English Disc is \$1,090 per year for quarterly updates and \$1,690 per year for monthly updates. Upgrades and toll-free support are included.

Vendor Support. The Library Corporation has been producing information for libraries since 1974. It introduced its first CD-ROM application, BiblioFile Catalog Production System, in January 1985. This was one of the first CD-ROM applications available. The Library Corporation has toll-free phone support and uses Federal Express and couriers for replacement of components.

Chapter 15

Media Flex

Mandarin is an integrated library automation system that includes modules for an online catalog, circulation, data entry, and report generator. These modules are sold together as one system. The modules are not sold separately as most of the other micro-based systems are. Media Flex does sell a separate data conversion program called "Spindle" that will be discussed later.

Media Flex claims the Mandarin software can theoretically handle more than 2 billion bibliographic records. This limit has not been tested due to current hardware memory limitations and the failure to locate a library with a collection this size. Currently the largest collection in a public library using Mandarin contains 100,000 records (85,000 titles). The circulation at that library is approximately 250,000 per year. Mandarin does support union catalogs with over 200,000 titles. The most microcomputers on a network is currently limited only by the Novell networking software.

Product:	Mandarin
Version:	1.2
Company:	Media Flex, Inc.
Address:	P. O. Box 1107 Champlain, New York 12919-11107
Phone:	(518) 298-2970, (800) 628-2828

Database Structure

Mandarin's strong selling point is its flexibility in design. Library staff can define up to 100 separate databases, each with its own structure and record format. For example, there could be separate databases for books, AV materials, journals, pamphlets, realia, each with a bibliographic record best suited for that particular material type.

The Mandarin system does not have a separate record for each item in the collection nor does it maintain a master record with item level records linked to it. These are the two most common options for storing cataloging and circulation data. Instead, Mandarin uses a third type of structure: each bibliographic record is a single master record with repeatable fields (up to 255) for item level data. For example, the title is listed only once but the fields for barcode, price, etc. are repeated for as many copies as are held (up to 255).

Media Flex has several standard bibliographic database formats from which the library may choose or the library may design its own. Adding to its flexibility, Mandarin allows the user to add fields in the future if needed. The maximum size of a record is 8192 bytes. Library staff can define 24 fields, each with nine subfields per field and a 25th field with five subfields. The maximum field length (either fixed or variable) is 6144 characters. Fields have tags consisting of three numeric characters in the range 010-255. This range does not correspond to numerical range used in MARC tagging. The system may be configured to store a full MARC record. Any field may be indexed. The system indexes using inverted binary trees, a fast method of indexing.

Database Creation. Media Flex can transfer MARC records from a nine-track magnetic tape to floppy disks for transferring cataloging data to the hard disk. The cost for this is 5¢ per record. This cost includes insertion of barcode numbers.

Ongoing Conversion and Database Maintenance. "Spindle" is Media Flex's data conversion program. It can convert data from Bibliofile, OCLC, Utlas, Dobis, Ebsco, dBase II, dBase III, and MicroLIF records. Separate versions of Spindle are used for each of these data sources. Spindle includes one converter of the user's choice but additional converters may be purchased. Converters for other catalog or patron databases can be developed for a fee.

Cataloging records may also be entered from the keyboard. The "Basic Entry" option prompts with field names and staff can enter data in those fields when it is appropriate. Any missing data can be entered at a later date using the "Secondary Entry" function. This function allows the user to select a group of records by Internal Sequence Number (accession number) and the system will prompt for those fields that are defined but lack data. With the "Modification" function the user may select a record or group of records and a field or group of fields to be listed, added, deleted, changed, transferred, or replaced. Once entries or modifications have been made, the user may print the records to verify correctness. There is currently no authority control but global editing is currently being tested. Mandarin can generate new acquisition lists limited by a date range set by the user. The report may be sorted by author, title or subject.

Record Output. Mandarin can output full MARC records in either MicroLIF or MARC format to floppy disks.

Online Public Access Catalog

Mandarin has two levels of searching the catalog, one designed for the novice searcher and another designed for experienced users. The default search screen for the novice user consists of three boxes for subject, author, and title. The user may enter data in any or all of these fields. The default logic between fields is "Subject OR Title AND Author," but the library may change these defaults during the initial program set-up. The user may explicitly include Boolean logic within a field (for example, "dog OR cat" in the subject field) but the logic between fields is fixed by the library. The catalog supports right truncation.

The default set-up is to search by subject, author, and title, but each workstation can be configured individually to search on other fields. Because any field may be indexed and the library can choose any three indexed fields to be displayed, the system offers considerable flexibility. For example, a station could be set up to search subject, language, and material type to develop subject bibliographies limited by language and/or material type. The system displays the search results in a list format. The user may then select a title and display a more complete record. Assuming the circulation module is operational, the complete cataloging record display includes the circulation status and due date of the item.

Experienced users can search by keyword in any fields that are indexed. The search format is similar to that used by online databases like Dialog and BRS. The user enters the search request using mnemonics for the field to search, for example, "A" for author and "S" for subject. The Booleans "AND," "OR," and "NOT" are supported in addition to the relative operators ">" and "<" and right truncation. For example, "T computer OR S computer" would find all records with the word "computer" in the either title or subject field. The search "A Pearl T Earth" would find all records with "Pearl" in the author field (anywhere in the author's name) and "Earth" in the title. The Boolean "AND" is implicit between fields. The result of a search is a "hitfile" of ID numbers for items that meet the search criteria. The system displays the number of "hits" (records found) and allows the user to display the list, revise the search strategy, or combine the search with previous searches. The system

retains and can display the last eight search requests. The user can combine these using Boolean operators. For example, by entering "3 AND 4," the user can obtain only those records that satisfied both the third and fourth searches. Search results may be saved to disk or printed. Mandarin includes several alternative screen displays, including full MARC. The system also allows the library to design its own formats. Records that match a search are sorted by call number which is the default. Staff can also set-up other sorts including author or title for report purposes. Mandarin has a stop word list which includes prepositions and articles. It can be modified by the library. The OPAC can be searched by dial-access.

Circulation

The circulation system handles loans, returns, reserves, renewals, holds, and fines. Borrower and item barcodes may be entered using a barcode reader or may be entered manually through the keyboard. The borrower name or item title cannot be used for transaction purposes. The staff could find the borrower number by searching the patron file and the item number by searching by title.

Media Flex has a patron record format but the library can choose to design its own format and index any fields in that patron record format. There are 20 borrower and material categories, each having user-definable limits for loan periods, reserves, holds, fines, and grace periods. The system will alert staff at check-out if the patron has exceeded any of the established limits. The alerts can be overridden by authorized staff.

The system displays the date due at check-out along with the borrower status. The borrower status window lists the number of loans, renewals, overdues, holds, reserves, fine transactions, and items in circulation for that patron. The system determines due dates using the loan period established in the borrower and material categories and a calendar set up by the library. It does not print due date slips. Mandarin allows grace periods determined by material type. If the item is not returned by the end of the grace period, fines accrue from the original due date.

The system lists all possible actions available within the check-out function in a command line at the bottom of the screen. This format is followed throughout the circulation module. The check-out function allows staff to display full cataloging information on an item, display the reserve queue for an item, and display the loans and fines record for the patron.

The loans and fines record lists the titles the user currently has checked out, along with the check-out date and date due. If fines are due on an item, it will list the amount due per item and a total amount due for overdues. Fines for lost or damaged items may be included. A total for all fines due is also listed. There is no print option, but staff could print the data on the screen using the "print screen" key on the keyboard. To enter the fine payment function, staff must exit from the check-out function and return to the main circulation menu. Fine rates are set by the material type or patron type. As stated earlier, the patron loan and fine display lists all overdues by individual item. Partial payments are accepted. Mandarin will print overdue notices. The system does not automatically generate successive notices at predetermined intervals.

Renewals can be made easily by phone if the borrower and item barcode numbers are known. If the patron is not able to supply these numbers, staff could search for them and complete the renewal. If an attempt is made to check out an item that has not yet been checked in, Mandarin will automatically check the item in before checking it out. The system alerts staff at check-in if an item has a reserve on it. The library may set a maximum number of reserves per item. The reserve queue cannot be rearranged but authorized staff can override the reserve system to check out a book. The system prints reserve/hold notices and time limits may be set on holds.

Full or partial inventory may be taken with a portable scanning device. Mandarin produces an inventory report listing the items and status of the items (for example, on shelf,

checked-out, or missing). The circulation module's utility function displays circulation activity status and statistics including the number of loans, renewals, overdues, items in circulation, holds, reserves, fine transactions, returns, and dollar amount of fines owed and paid. The display lists these by current status, current period, year-to-date, and system-to-date. The library determines the period length which may be day, week, month, or other time period. The system uses Code 39 barcodes which allows for assigning alphanumeric numbers for the patron and item barcodes.

Report Generator. Mandarin has a report generator which allows the library to create customized reports. These reports may include date stamping by the system or headers and pagination set by the user. Reports can include any indexed field and can be displayed on the screen, saved to disk, or printed. Because the library can include and index any field in the patron record, the system could track circulation by the political subdivision of the borrower.

System Attributes. At first glance, the mnemonics used for commands (for example, NXTDOC, NXTTXX, DBOR, and DDOC) appear cryptic. But abbreviations are used consistently and once the user masters the conventions (for example, NXT for next, TTX for transaction, DOC for document, D for display, and BOR for borrower), the mnemonics are easily decipherable.

Mandarin's flexibility in allowing library staff to define the formats of the cataloging and patron records and determine which fields to index is not found in most other micro-based automated systems. Media Flex claims to have built into the system extensive error messaging to help the user diagnose problems that may occur. All Mandarin error messages begin with "M" to differentiate them from DOS error messages.

Networking. Mandarin will network using Novell networking software. The number of workstations on the network is dependent on the networking software chosen.

Backup and System Security. The system uses passwords to allow staff access to the various modules and menu functions. Mandarin does not have its own backup utility. File backup to floppy disk uses DOS. Large libraries should consider an external tape cartridge backup, 60 MB or greater, which is compatible with the local area network that is used.

Hardware/Software Requirements and Costs

For the file server or a configuration using just one microcomputer, Media Flex recommends the IBM PS2, Model 60 (70 or 80, budget permitting). Mandarin also operates on an IBM AT and compatibles and a COMPAQ 386 and compatibles. If the file server is non-dedicated there should be at least 3MB of RAM. If the server is dedicated there should be at least 1MB or more of RAM. The hard disk should have an access time of 28 milliseconds or less and be at least 70MB or greater. Media Flex will work with library staff to help determine the hard disk size requirements. A monochrome card and monitor are sufficient though the system does support color.

The recommended workstation connected to the LAN could consist of a PS2 Model 25 or 30, 640K RAM, one disk drive, monochrome monitor (color is supported), and enhanced keyboard. Media Flex recommends the PS2 Model 30 as a circulation workstation for faster performance. Media Flex recommends Novell ELS-1 for networking up to four workstations, Novell ELS-2 for up to eight workstations, and Novell Netware 286 for up to 255 stations. Also needed for networking are cables and interface cards for the server and each workstation.

Additional suggested equipment include an Epson or compatible printer, a barcode reader, barcode labels, standby power, surge protection, and anti-static mats. A Hayes

compatible 2400 baud voice-to-data switchable modem is recommended for remote searching and diagnostics. The Mandarin software license is a one-time fee which includes one configured catalog and one standard-format borrower database. A single user system costs \$4,000; a multi-user system \$5,000. To add another standard database configuration costs \$150. Additional fields can be added for \$50 each. Media Flex can dial into the system and perform diagnostics and software repair if the library buys a modem and Media Flex's "Service Communications Program" (\$175). Purchasing dial-up communications software (\$275) allows for remote searching of the OPAC, electronic mail, and file transfer. Mandarin allows library staff to create custom databases as needed but Media Flex technicians will consult, design, and configure a custom database for a fee. The Spindle software license is \$450 for the first converter and \$150 for each additional vendor format. Formats not currently supported can be developed for a fee.

Vendor Support. Media Flex has been marketing Mandarin for five years. The annual extended warranty agreement, which includes updates, replacements, toll free phone support, and newsletter is \$600 for a single station and \$750 for a multiuser environment.

Media Flex strongly recommends on-site training. They recommend three days spent reviewing start-up, shutdown, backup, online searching, data entry, catalog update, reporting functions, and strategies for barcoding the collection. Up to five staff members may attend. Another two days is required to teach the circulation system and address any items needing review. Media Flex suggests this two-day segment be scheduled after the initial three day session. The cost for on-site training is \$300 per day plus expenses.

Miscellaneous. Mandarin can accommodate ten different languages in the Roman alphabet. Currently available are English, Spanish, and French. Italian, German, and Swedish are under development.

Related software available from Media Flex includes "Buy George," an acquisitions program, and "Zapper," a security system which will sensitize a book at check-in by the system and desensitize it at check-out.

Chapter 16

Winnebago

Winnebago CIRC and Winnebago CAT are Winnebago Software Company's circulation system and online public access catalog for IBM and IBM compatible microcomputers. They may be purchased and used separately but together form an integrated system using a single database. A Data Entry Module is included in the purchase of Winnebago CAT or Winnebago CIRC but may be purchased separately to begin record conversion. Also available from Winnebago is the MARC Conversion Module.

The system claims to handle up to 200,000 items and 50,000 patrons. The largest database using both Winnebago CIRC and Winnebago CAT is a public library in Nevada consisting of 109,800 items and 2,000 patrons. The most microcomputers currently on a single network is nine. Winnebago CIRC does not put any software limits on the number of circulations and the Winnebago Software company does not track circulation figures for libraries using its system so the highest yearly circulation is unknown.

Product:	Winnebago CIRC, Winnebago CAT
Version:	2.1
Company:	Winnebago Software Co.
Address:	121 South Marshall Caledonia, MN 55921
Phone:	(800) 533-5430, (612) 688-9438

Database Issues

The system contains one record for each item rather than a master record for each title with item records attached. The default cataloging record format is:

barcode	8	publisher	20
title	50 characters	copyright date	5
author	30	fund	10
call #	16	location	10
ISBN/LCCN	13	subjects	50 characters each (unlimited number)
price	6	user defined	15
material type	3		

The system can store a full MARC record if the library chooses that option. In this case, the field lengths are unlimited.

Item record fields indexed for searching purposes are barcode, author, title, subject, and material type. There are 300 material types possible, each with its own fine rate, number of hours or days on loan, overnight checkout, grace period, and renewal limit.

Database Creation. Winnebago can transfer MARC records from a nine-track magnetic tape to floppy disks for transferring cataloging data to the hard disk. The cost for this is 5¢ per record. This cost includes insertion of barcode numbers. Winnebago can load a library's initial database by taking MARC records from a nine-track tape. There is a \$250 setup fee and 5¢ per record cost for this service. (If barcode labels are requested, the cost increases to 7¢ per record.) Output is to 3 1/2" or 5 1/4" floppies which the library then loads onto its hard disk. A MARC conversion module is available to convert MARC records (OCLC, WLN, BiblioFile, LaserQuest, MITINET/marc) to MicroLIF records. The MicroLIF records can then be loaded from floppy disks onto the library's hard disk.

Ongoing Conversion and Database Maintenance. After the initial load, the database can be updated by several means using the Data Entry/Modify Data Module. The Data Entry Module is included in the purchase of Winnebago CIRC or Winnebago CAT or may be purchased separately to begin database creation before obtaining one of the other modules.

The "Data Entry/Modify Data" module allows staff to add, edit, delete, look up, and clear material and patron information in the Winnebago record listed above. Records can be edited and deleted record by record or globally with the batch mode. The user may call up an existing record, modify it, and add it to the collection for duplicate copies or similar items. The library can enter data directly onto the hard disk using the software provided, or catalog and store the data on floppies to add later in batch mode. If only the circulation system is purchased, the user is still able to enter complete Winnebago records.

The MARC conversion module allows records to be loaded into the system from OCLC, WLN, BiblioFile, LaserQuest, MITINET/marc. The library may choose to have these records entered in MicroLIF format or the Winnebago format. In addition, the Winnebago CAT can load MicroLIF records from floppies distributed by book vendors including Baker and Taylor, Brodart, Children's Press, Bound to Stay Bound, Econoclad, Follett, The Perfection Form Company, and others.

The system allows a library to store and view a full MARC record. It allows the user to update the fields of the record which are contained in the Winnebago record (the first 50 characters of the title). A recent upgrade to the Data Entry Module allows keyboard input and editing of the full MARC record. There is no provision for local authority control. The system does not generate "see" and "see also" references though the demonstrator was able to show how the system could be fooled into displaying references by creating dummy records. This should not be viewed as a substitute for an authority control module.

Record Output. Winnebago CAT will download MicroLIF records to floppies. The MARC Conversion Module can download records in USMARC format to floppies.

Online Public Access Catalog

Selecting the "ON-LINE CATALOG" option on the main menu puts the user into the searching mode. The commands that can be used are listed on the right hand of the screen and are accessed through the function keys. The user selects either keyword or key phrase, a source or sources to search (subject, title, notes, or combination of the three) and a Boolean operator if desired (AND, OR, AND NOT). The user also has the option of including the author's name. A browse function allows the user to look at the key words and select one to search. All of these selections are made using the function keys. Right justified truncation is available using an "*" (asterisk).

By pressing the "RETURN" key, the user may view a list of the items found by the search. The list displayed includes the call number, title, author, material type, and circulation status if the Winnebago CIRC module is also operational. The list is in the order in which

the items were added to the system. By pressing a function key, the list can be rearranged in call number order. The arrow keys allow the user to browse through the materials found. The user can view the display in either card catalog or MARC format. The "PgUp" and "PgDn" keys allow the user to browse through the records without having to go back to the original list. A bibliography sorted in call number order can be printed by pressing the sort function key followed by the bibliography function key. All items in the most recent search will be printed. The user has the option to delete specific items from the list.

Winnebago CAT also includes a "Regular CAT", which is a simplified catalog in which the user can search by author, title, or subject but does not have the key word, key phrase, or Boolean search capabilities. The "Regular CAT" has automatic right-hand truncation. Catalog reports include materials list with subject listings, a subjects list, and a keyword list. A beginning and ending range may be given for each of these.

Circulation

Winnebago CIRC uses barcodes for not only the patron ID card and materials but also for each function (check-in, check-out, reserve, etc.). The patron barcode and the material barcodes are scanned first (in any order) and then a function barcode. For example, the user scans the patron's ID card, then scans the material barcode or codes, and finally the "check-out" command barcode. This is the default method. Alternatively, the user can, by hitting the "ESCAPE" key, display a circulation menu and select a function using the keyboard rather than using a bar wand.

Look-up of the patron name, title, or subject within circulation is done by entering the first character or characters of the item. In response to receiving input from the keyboard, the system responds with a look-up menu. The user then selects the index to be searched (patron, title, or subject). The system displays the selected index and highlights the closest match. The user can then browse the index using the arrow keys to highlight and select an item. The information selected can then be used in the next transaction. The capability to browse and select information using the first letters of the patron's name and title make it possible to renew materials by phone and check out materials when the patron has forgotten his/her library card. The patron record includes fields for barcode, last name, first name, address, city, state, zip code, card expiration date, usage, patron type, and three user-defined fields tied to the patron type. The field names, other than the three user-defined fields, cannot be changed.

The library can define up to 99 patron types. The patron types determine how the three user-defined fields are to be used. For example, for a school library, the patron type "student" may use the three user-defined fields for homeroom, graduation year, and parent name. The patron type also determines what privileges are to be assigned to a given type. Some of the patron privileges are the ability to set his/her own due dates, check out with overdues, exceed the renewal limit, renew overdue books, check out with fines. The patron type also determines the maximum check-out limit.

The patron record is indexed by barcode, last name, and patron type. The library may choose one additional field to index, though the indexing process is very slow and would probably need to be done during off hours. Both patron and item records may be added "on the fly." That is, while the system is in regular operation. When the patron's barcode number is input at check out, the system responds by printing the patron's name, a list of the materials he/she has out, the date they were checked out, and the due dates. If the user has outstanding fines a "\$" will appear after his/her name. If any of the materials are overdue, they are highlighted. The list of materials currently checked out may be suppressed if the privacy option is invoked.

Due dates are automatically generated from the loan period designated in an item's material type, taking into account the days the library is closed. The system setup allows the library to enter the days the library is closed on a month to month basis. The system displays the selected month in calendar format and, using the arrow keys, staff can select

individual days to open or close. Each material type may be assigned a grace period. If an item is not returned within the grace period, fines accrue from the original due date. The system does not print due date slips. A list of all items checked out, due dates, and outstanding fines for a patron, can be printed by doing a screen dump. The system has a renewal function. A limit may be set on the number of times an item may be renewed but the library is not able to set renewal loan periods different from the original loan period. Items may be renewed by phone.

Fines can be negotiated and/or paid in part or in full. At the time of the demonstration, a fine could only be negotiated down to 1¢ with the final penny "paid" to remove the fine from the record. This has been corrected and now fines can be negotiated down to nothing. Payments or partial payments made by a patron are deducted from the longest outstanding fine in their record. Fines may be added to a patron's record for lost or damaged items.

Items may be placed on reserve. There is no limit to the number of reserves that may be placed on an item. An item cannot be removed from the database if there is an outstanding hold on the item. The reserve queue is by date and time of the request. The queue may not be rearranged but may be overridden by staff at check-out. The system alerts staff at check-in if there is a reserve on an item.

For report purposes, the Winnebago system allows the user to select one field to be indexed in addition to those cataloging record. The field may be chosen from any of the fields of the material or patron record and changed as the need arises. It takes several hours to create such an index so the library would need to plan ahead and do the indexing during off hours. Material reports include materials lists, materials lists with usage figures, and materials checked out. Each of these lists can be indexed by barcode, title, author, or call number. The user can select a range to be printed. Patron reports include patron lists selected by barcode or alphabetic range of last name. The system will also print an expired card list. Usage reports include usage by material and usage by patron type. The reports indexed by patron type can be sorted on the three user defined subfields. Both reports give monthly and yearly totals for each type.

A report of usage by political area (usage by patrons from other towns, villages, etc.) can be generated by assigning each area to a different patron type number. Because there are 99 possible patron types, there is enough flexibility to include political jurisdictions in addition to the patron types needed for the library itself (adult, juvenile, staff, etc.).

Overdue lists can be sorted on any of thirteen fields from the patron record. Selected patron types and material types may be excluded. Fine lists can be limited by patron barcode range. Fine notices may also be limited by patron barcode range. The system does not automatically generate second and third overdue notices at intervals specified by the library. Reserve lists and notices may be generated.

The system prints outstanding fine lists, overdue lists, and mail ready overdue notices on mail ready cards or paper.

Inventory can be done with a bar wand and a computer, or the Portable Reader. The Portable Reader is a hand-held device with a liquid crystal display, which enables the operator to see and verify the barcode numbers as they are being inventoried. It has a keypad to allow the user to enter the numbers directly rather than using the wand. It can do either a partial or full inventory and print all materials in the inventory and all missing materials.

The system uses Code 39 barcodes. Winnebago can provide smart barcodes which include the title, author, and call number. The system can also print barcodes and address labels.

System Attributes. Viewing screens throughout Winnebago CIRC and Winnebago CAT are uncluttered and easy to read. Keyword searching in Winnebago CAT is easy enough for the novice searcher but still provides flexibility and power searching through Booleans, truncation, and field selection. The use of function keys to choose fields to search and

Boolean operators eliminates the need for a patron to enter the designations of the fields to be searched. Patrons need only type in the actual words to be searched.

Networking. The maximum number of terminals that can be networked depends on the network used. Winnebago's network will support up to 90 terminals. Its system will run on other networks like Novel provided they are Netbios compatible. Many of those networks will support 250 or more terminals. The host/server is not dedicated, so it may be used for other purposes while it is serving the network.

Backup and System Security. Backup functions are built into the system. Backups may be made to floppies, though backup to streaming tape is recommended. It is possible to backup only selected files. Security for the system is done through passwords on the functions themselves rather than passwords assigned to each user.

Hardware/Software Requirements and Costs

A single station requires an IBM XT, AT, Personal System/2 (all but model 25) or IBM compatible hardware with a minimum of 640K internal memory, 1 floppy disk drive, and Epson or Epson-compatible printer with tractor feed, and a hard disk drive (1 MB for every 1000 records with a minimum of 20 MB or 1 MB for every 500 records if the notes field is included.)

A multi-station setup requires the same configuration as a single station plus a networking card, cable, and software. Each additional station requires the same, minus the hard disk drive. Also required is a bar wand with interface card. Available, but not required, is the Portable Reader used for taking inventory. Other optional items include a streaming cartridge tape drive backup and a battery-powered backup power supply.

Winnebago CIRC and Winnebago CAT each list for \$995 and include one year of customer support. A metal bar wand with interface card is \$495.95. The Portable Reader sells for \$695. Networking cards, cables, and software start at \$500 per terminal. Winnebago's networking software is only \$250 per terminal. The network cards and cables may be purchased from an outside source. The network software must be bought from Winnebago. The MARC conversion module to convert MARC records to MicroLIF records costs \$179.95. The Data Entry Module, if purchased separately, is \$200. This amount is subtracted from the purchase price of Winnebago CIRC or Winnebago CAT when purchased.

Vendor Support. The customer support plan is free for the first year and \$100 each year after for a single module. If both modules are purchased, support is \$150 per year after the first year. There is no added support fee if a network is purchased. Support includes a toll free phone number, a quarterly Winnebago Users Group (WUG) newsletter, updates to software, manual revisions, and replacement disks. Phone support is available Monday through Friday from 8 a.m. to 5 p.m., Central time. If immediate help is not available, they guarantee a call back within two hours. Remote dial-in diagnostics and software repair is not available.

The purchase and installation of new releases is not mandatory. If no maintenance agreement is in effect, the vendor will still support an old release at a charge of \$10 per call. The vendor will profile the library to determine its hardware needs. An inservice is included in the purchase price of the program. The library may choose to have the software installed at this time. Technical training is available at Winnebago headquarters in Minnesota. Contact Winnebago for the cost of on-site training.

Miscellaneous. If the library has patron records in ASCII format on a DOS machine, Winnebago will write software to convert those records and load them onto floppies so they may be used in Winnebago CIRC. The cost for this is \$179.95. The system does not have remote access capabilities but this feature is currently being tested in several libraries.

Appendixes

Appendix A: Sample Automation Costs

Appendix B: Model System Evaluation Checklist

Appendix C: Microcomputer-based Automated System Vendor List

Appendix D: Extracting MARC Records for WISCAT

Appendix E: Automation and Computer Glossary

Sample Automation Costs

The following information represents the costs of software, hardware, and related components incurred by the Rosholt School District in Rosholt, Wisconsin. The Rosholt High School and Elementary/Middle Schools are combined in one building. There are two media centers, one for the high school and one for the combined Elementary/Middle School. The two media centers are in separate, but adjacent, rooms. They have installed Follett Software Company's "Circulation Plus" circulation system and Follett's "Catalog Plus" online catalog.

The schools participate in WISCAT, the Wisconsin Union Catalog. Their retrospective conversion was done using the MITINET program and their MARC records were extracted from WISCAT for use with Follett's system. The costs outlined below do not include the staff time associated with the schools' retrospective conversion or barcoding.

The costs outlined were not incurred at once but were spread over three budget cycles. Circulation Plus became operational in September 1988. The Rosholt schools were a test site for Catalog Plus in January 1990, which became operational in May 1990.

Hardware

No.	Description	Cost
1	file server (IBM* model 80 w/70 MB drive)	\$5,247.00
1	RAM expansion module for file server (2 MB)	1,186.00
1	Internal 80 MB streaming tape drive for back-up (w/software)	626.00
2	circ stations (IBM model 25 and model 30 w/3.5" drive)	2,199.00
4	OPAC stations (IBM model 30s w/3.5" drive)	5,448.00
4	Epson printers (2 FX800 and 2 FX 850)	1,568.00
4	six foot printer cables	80.00
2	four-position printer switch boxes	192.00
1	Barcode reader w/interface card	300.00
1	PHD+ (portable scan device = acquisition, circ., inventory)	850.00
1	Cooperative Education Service Agency (CESA) surcharge on hardware	40.00
Subtotal:		\$18,285.00

* Because of the availability of service, it was decided to purchase IBM hardware rather than less expensive compatible hardware. The hardware cost included installation.

** The other barcode reader was bundled with the circulation software.

Software

No.	Description	Cost
1	Circulation Plus, (w/barcode reader and interface card)	\$ 995.00
1	Catalog Plus	795.00
6	DOS version 3.3 (for circulation and OPAC stations)	524.00
	Subtotal:	\$ 2,314.00

Local Area Network

No.	Description	Cost
1	Host Plus Link Network System (card, junction box, cable)	\$ 324.00
6	Plus Link Terminal sets (card, junction box, cable)	2,460.00
—	Plus Link bulk cable, 100 feet	25.00
	Subtotal:	\$ 2,809.00

Record Extraction and Processing Costs*

Description	Cost
MARC records extracted from WISCAT (10,416 @ \$.005 per record)	\$ 52.08
Follett charge to process MARC records for Circulation Plus	1,066.40
Follett charge to upgrade Circ. Plus records for Catalog Plus*	1,100.00
Subtotal:	\$ 2,218.48

*Because the circulation system was installed over a year before the OPAC, the brief Circulation Plus records had to be upgraded to more complete cataloging records for Catalog Plus.

Supplies

No.	Description	Cost
—	WISCAT titles "smart" barcode labels (paper)	\$ 554.26
5,000	laminated Non-WISCAT title barcode labels @ \$48.00/1,000	240.00
1,000	laminated patron barcode labels @ \$48.00/1,000	48.00
1,000	laminated Temporary item barcode labels @ \$48.00/1,000	48.00
5,000	barcode protectors @ \$ 25.00/1,000	125.00
1,000	continuous Roladex cards	14.00
10	double sided/double density 3.5 disks @ \$2.50/disk	25.00
50	double sided/high density 3.5 disks @ \$7.00/disk	350.00
—	5 cassette tapes for back-up @ \$27.50/tape	137.50
	Subtotal:	\$ 1,541.76

Installation/training

Description	Cost
Circulation Plus training (6 hours)	250.00
Circulation Plus installation and training (2 days)	\$ 750.00
Subtotal:	\$ 1,000.00

Miscellaneous

No.	Description	Cost
1	Rollodex, 500 card, non-locking	\$16.29
1	Rollodex, 1,000 card, locking	46.25
1	IBM Migration Facility	20.00
1	16 foot IBM printer cable for data migration	25.00
5	10 foot drop cables & adaptors	245.00
6	anti-static mats @ \$40.00 each	40.00
1	barwand extension cable, MSDOS	24.00
7	power surge protectors	281.75
2	tables for OPAC stations (each holds 2 OPAC stations)	236.00
	Subtotal:	\$ 1,134.29

Ongoing Service Contracts

Description	Cost
IBM onsite coverage for equipment during warranty	\$ 55.00
IBM Service Contract for IBM Equipment (3-15-89 to 3-15-91)	858.00
Follett Support Agreement for Circ Plus (3-31-89 to 6-1-91)	233.00
Follett Support Agreement for Catalog Plus (90/91 school year)	275.00
Follett Support Agreement for PHD+ (2 units 1989-90)	250.00
Subtotal:	\$ 1,671.00

Total: \$ 30,973.53

Model System Evaluation Checklist

The following checklist can be used to narrow the field of prospective automated systems to consider. The checklist includes the major features listed in the chapters in section II. Refer to chapter 3 for more information on developing a checklist.

The staff should determine what features listed below are mandatory, highly desirable, and desirable for their library. The vendor should check what features are not available, in development, available, and at variance.

The checklist below is just a model. It is designed primarily to show the form of a checklist and not its content. Be certain to include any other features deemed mandatory, highly desirable, or desirable from section II of this publication or from other sources.

The library's priority rating for the features listed:

- E = Essential (or "C" for critical)
- H = Highly desirable
- D = Desirable

Availability of the feature listed from the vendor's automated system:

- N = Not available (no)
- I = In development
- A = Available (yes)
- V = Variance, available but not exactly as stated in the checklist
(vendor should provide further explanation)

* The features listed in section II are available on disk. Send a blank MS-DOS 5.25 or 3.5 inch disk to: Wisconsin Division for Library Services, Attention: Robert Bocher.

Database Creation/Maintenance Module

Library's Availa-
priority bility

- ☐ ☐ Has capacity for _____ unique titles
(state the number of titles in the library)

Accepts MARC records on tape or MicroLIF records on floppy disk from:

- ☐ ☐ WISCAT
☐ ☐ Bibliofile
☐ ☐ book vendor MicroLIF
☐ ☐ Other _____
☐ ☐ Can a library define what data (specific field/subfields) are to be downloaded from the MARC/MicroLIF record
☐ ☐ Allows keyboard entry of catalog data without need to learn MARC format
☐ ☐ Allows locally defined fields
☐ ☐ Can automatically create item level records for a circulation system

Stores cataloging records in:

- ☐ ☐ MARC format
☐ ☐ MicroLIF format
☐ ☐ Other _____
☐ ☐ Stores only a brief record for each copy of an item
☐ ☐ Stores a complete record containing full cataloging data

Outputs cataloging records in:

- ☐ ☐ MARC format
☐ ☐ MicroLIF format
☐ ☐ Other _____
☐ ☐ Allows editing of fields and subfields in cataloging and patron records
☐ ☐ Provides comprehensive editing including global editing
☐ ☐ Updates all indexes while system is in normal operation
☐ ☐ Provides authority control including see/see also references
☐ ☐ Provides an automated backup process of all data and files
☐ ☐ Prints catalog card sets
☐ ☐ Prints spine and pocket labels for new acquisitions
☐ ☐ Generates various reports in flexible formats defined by library
☐ ☐ Provides password or some other type of security
☐ ☐ Provides multiple access via a LAN

Circulation Module

Library's Availa-
priority bility

- | | | |
|--------------------------|--------------------------|---|
| ☐ | ☐ | Allows quick changing from one function to another |
| ☐ | ☐ | Accommodates _____ collection types (state number of collections in your library) |
| ☐ | ☐ | Has separate item record for each item (copy) |
| ☐ | ☐ | Item records are linked to a master catalog record |
| ☐ | ☐ | Allows charging and discharging of items using barcodes and optical reading devices |
| ☐ | ☐ | Maintains average response time of two seconds during peak use |
| ☐ | ☐ | Allows entry of patron number once for checking out many items |
| ☐ | ☐ | Retrieves patron record by barcode number and name |
| ☐ | ☐ | Displays due date and status of item on the screen |
| ☐ | ☐ | Check the item and patron's status at charge out and alerts staff if there are any problems |
| ☐ | ☐ | Allows staff to override any system alerts |
| ☐ | ☐ | Allows the number of loan periods and their length to be defined by staff |
| ☐ | ☐ | Allows different renewal policies by collection and/or patron type |
| ☐ | ☐ | Allows different reserve policies by collection and/or patron type |
| ☐ | ☐ | Allows holds to be placed on items |
| ☐ | ☐ | Lists holds on screen and prints hard copy |
| ☐ | ☐ | Automatically calculates fines and overdues |
| ☐ | ☐ | Allows different fine rates by collection and/or patron type |
| ☐ | ☐ | Prints overdue notices in various formats |
| ☐ | ☐ | Accommodates _____ patrons (state the number of patrons for your library) |
| ☐ | ☐ | Accommodates _____ patron types (state the number of patron types in the library) |
| ☐ | ☐ | Allows patron records to be created, edited, deleted |
| ☐ | ☐ | Allows locally defined fields in patron record |
| ☐ | ☐ | Accepts patron data already in machine-readable form from another source |
| ☐ | ☐ | Allows inventory with a portable barcode scanner |
| ☐ | ☐ | Generates circulation reports and statistics in various formats |
| ☐ | ☐ | Allows staff to conduct basic searching while in the circulation mode |

Online Public Access Catalog (OPAC)

Library's priority Availability

- | | | |
|--------------------------|--------------------------|--|
| ☐ | ☐ | Allows library to define what fields/subfields should be indexed and searchable |
| ☐ | ☐ | Allows keyword indexing and searching (any indexed word in a record) |
| ☐ | ☐ | Allows the patron to specify what field/subfield to search |
| ☐ | ☐ | Allows the patron to enter words to be searched in more than one field |
| ☐ | ☐ | Allows searching by direct word order |
| ☐ | ☐ | Allows, at a minimum, searching by author, title, and subject |
| ☐ | ☐ | Allows Boolean logic searching (And, Or, Not) |
| ☐ | ☐ | Allows searching with truncation |
| ☐ | ☐ | Allows searching with wildcards |
| ☐ | ☐ | Allows searching by browsing the indexes |
| ☐ | ☐ | Ignores the entry of stopwords and continues the search |
| ☐ | ☐ | Searching is basically menu driven |
| ☐ | ☐ | Searching is basically command driven |
| ☐ | ☐ | Patron has option of using menus or commands |
| ☐ | ☐ | Has easy-to-follow screen displays |
| ☐ | ☐ | Includes context sensitive help screens or prompts |
| ☐ | ☐ | Allows patron to back out of a search one step at a time |
| ☐ | ☐ | Allows patron to start another search at any time |
| ☐ | ☐ | Displays brief cataloging data when more than one record matches a search |
| ☐ | ☐ | Displays a full record on request |
| ☐ | ☐ | Indicates location and availability of item (if used with circulation system) |
| ☐ | ☐ | Has security measures to prevent unauthorized access to other files |
| ☐ | ☐ | Operates as a union catalog (i.e., identifies holdings of various schools in district or other libraries) |
| ☐ | ☐ | Has dial access |
| ☐ | ☐ | Prints results of searches |
| ☐ | ☐ | Tracks the type of searches done |
| ☐ | ☐ | Provides an average response time of less than five seconds for a two word Boolean "and" search that matches five cataloging records |
| ☐ | ☐ | Provides an average response time of less than three seconds for a direct word order search that matches two records |

Hardware Issues

Library's priority Availability

- | | | |
|--------------------------|--------------------------|---|
| ☐ | ☐ | Operates on IBM PC (XT,AT,PS/2) and compatible hardware |
| ☐ | ☐ | Vendor will supply the hardware |
| ☐ | ☐ | Vendor provides hardware requirements |
| ☐ | ☐ | Vendor provides list of compatible hardware |
| ☐ | ☐ | Vendor recommends a specific LAN to purchase |

Vendor Support

Library's priority Availability

- | | | |
|--------------------------|--------------------------|---|
| ☐ | ☐ | Provides software warranty |
| ☐ | ☐ | Provides ongoing technical support |
| ☐ | ☐ | Issues regular software upgrades |
| ☐ | ☐ | Supports older versions of the software |
| ☐ | ☐ | Circulation and OPAC modules can be purchased separately |
| ☐ | ☐ | Provides assistance in loading the library's database |
| ☐ | ☐ | Provides onsite installation/training |
| ☐ | ☐ | Module(s) can be installed and learned without onsite help |
| ☐ | ☐ | Provides complete and easily understood program manuals/documentation |
| ☐ | ☐ | Provides demonstration disk and tutorial manual |
| ☐ | ☐ | Provides information on number of installed sites |
| ☐ | ☐ | Provides references upon request |
| ☐ | ☐ | Has organized user group |
| ☐ | ☐ | Has regular newsletter |
| ☐ | ☐ | Has other library-related programs. |

Microcomputer-based Automated System Vendor List

Below is a list of vendors offering automated circulation systems and/or online catalogs that operate on microcomputers. This list is not all inclusive and does not represent any type of endorsement. Let the buyer beware . . . Librarians interested in particular systems are encouraged to contact the vendors directly to receive the latest information on their respective systems.

Vendor	Representative And Phone	Software Name
Calico Company P. O. Box 15916 St. Louis, MO 63114	Bill Fabian (800) 367-0416	LION
Caspr 2011 South Stevens Creek Blvd. Cupertino, CA 95014	James Maloney or Norman Kline (408) 446-3075 (800) 85CASPR	MacLibrary
Chancery Software, Ltd. 500 - 1168 Hamilton Street Vancouver, BC Canada V6B2S2	Rondi Rebak (604) 685-2041 (800) 663-8831 Fax: (604) 685-9669	MacSchool CSL Library
Charles W. Clark Company 170 Keyland Court Bohemia, NY 11716	Roger Long (608) 781-0809	Molli
Clarion Computing 446 Gore Road Onalaska, WA 98570	Bert Lewis (206) 978-4682	
Columbia Computing Services, Inc. 999 Plaza Drive, Suite 400 Schaumburg, IL 60173	Debbie Wall (800) 663-0544 Robert Koshkarian (WI representative) (708) 330-6309	CLS - Computer Library System
Companion 3755 Evelyn, Suite 201 Salt Lake City, UT 84124	Bill Schjelderup (800) 278-6439 (800) 347-6439	Alexandria
Compel, Inc. 5113 27th Avenue Rockford, IL 61109	Terrance Champion (800) 545-0053	Melvil Surpass

Vendor	Representative And Phone	Software Name
Data Trek, Inc. 5838 Edison Place Carlsbad, CA 92008	Tom Beaudin/Terry O'Regan (619) 436-5055, (800) 876-5484 Fax: (619) 431-8448	
Eloquent Systems, Inc. 140 W. Fifteenth Street, Suite 107 North Vancouver, BC V7M1R6	Merv Richter (800) 663-8172 Susan Gill (314) 822-7072	Eloquent Librarian
Follett Software Company 809 North Front Street McHenry, IL 60050-5589	Denise Boucher (800) 323-3397 (414) 567-6178 Fax: (815) 344-8774	Circulation + Catalog +
Liberator Information Systems and Services, Inc. 6280 E. Progress Lane Parker, CO 80134-9009	(303) 841-4772	Liberator Library Mgmt. System
Library Automation Products, Inc. 352 7th Avenue, Suite 1001 New York, NY 10001	Carrie Hannah (212) 967-5418 Fax: (212) 967-5457	The Assistant
Library Corporation Research Park Inwood, WV 25428	Bill Payne (800) 624-0559 Fax: (304) 229-0295	Bibliofile Intelligent Catalog
Library Interface Systems, Inc. 7900 International Drive, Suite 632 Bloomington, MN 55425	Bob Baker, Pres. Crystal Clift, General Mgr. (612) 854-2189 & (800) 234-5183 Fax: (612) 854-2336	MacBook
Media Flex, Inc. P. O. Box 1107 Champlain, NY 12919	Harry Chan (518) 298-2970 (800) 628-2828	Mandarin
Professional Software 21 Forest Avenue Glen Ridge, NJ 07028	Robert Pujat (201) 748-7658	
Richmond Software Corporation 935 Brooksglen Drive Roswell, GA 30075	Bob Stevens (800) 222-6063 (404) 998-3155	Book Trak
Scholar Chips Software, Inc. 2030 Powers Ferry Road, Suite 308 Atlanta, GA 30339	Bernard Jeffcutt (404) 952-8250	
TKM Software, Limited 839 18th Street P.O. Box 1525 Brandon, Manitoba R746N3	(202) 727-3873 Fax: (204) 727-3338	MicroCAT
Winnebago Software Company 121 South Marshall Caledonia, MN 55921	Joe Fadlovich (800) 533-5430 (612) 688-9438	

Extracting MARC Records from WISCAT

WISCAT is the Wisconsin Union Catalog. It is a statewide catalog developed by the Wisconsin Department of Public Instruction, Division for Library Services. WISCAT is available on microfiche and CD-ROM. The 1990 edition contains over 3.6 million titles contributed by 710 public, academic, school, and special libraries throughout Wisconsin.

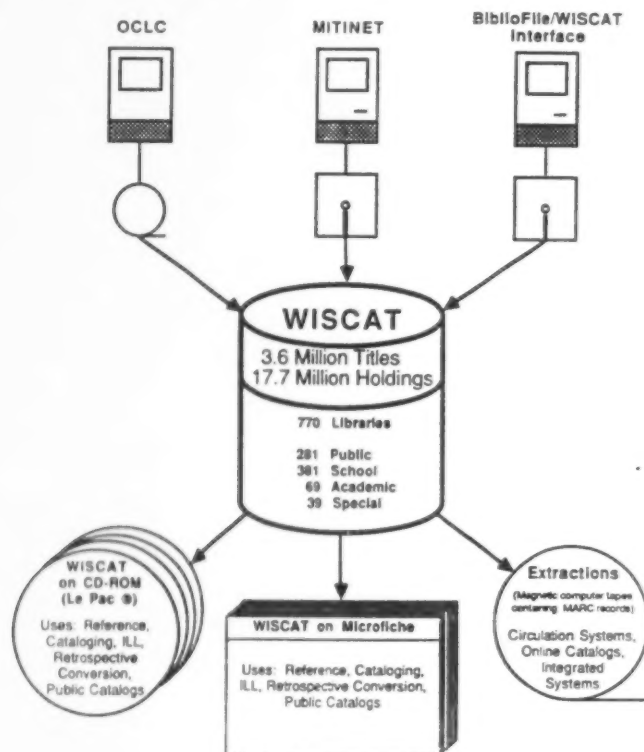


Figure 2: WISCAT, the Wisconsin Union Catalog.

WISCAT was developed for two primary purposes: as a tool for verifying interlibrary loan locations, and, as a source for obtaining MARC records for use in local automated systems. The following pages contain information on extracting MARC records from WISCAT for use in local automated systems.

Cataloging data for the 3.6 million titles listed in WISCAT are in the MARC format. Once a library has converted its collection to machine-readable form for inclusion in WISCAT, it can request an extraction of those MARC records. Requests for extraction of records are made through the Division for Library Services which works with Brodart, the vendor for WISCAT. Extractions are usually made in April, July, and September.

To make an extraction, Brodart Inc. identifies all the MARC records in the WISCAT database that have a holding statement from the library. The MARC records and a library's holding data (call number, number of copies, etc.) are then electronically copied from the WISCAT database to a nine track, reel-type magnetic tape. The MARC records that are extracted constitute the library's database which is the foundation for the library's automated system. Obviously, the automated

system the library selects must have the capability to accept MARC records. Not all vendors' automated systems can accept MARC records.

The Division for Library Services staff will work closely with the vendor and the library during the extraction process to accommodate an automated system's needs. Any technical questions staff or the vendor has concerning the MARC records extracted from WISCAT can be referred to division staff. As the purchaser and user of the automated system, someone on the staff should be assigned to act as liaison between the Division for Library Services and the vendor.

The process of getting MARC records from WISCAT or any other source into a local automated system is often complex. Every vendor has his or her own procedures for managing this process. While division personnel will work with library staff and the vendor during this process, library staff must assume the ultimate responsibility for the success of this process.

Staff planning to use MARC records extracted from WISCAT can expect specific questions from vendors about the library's MARC records. The questions may include how the library entered call numbers, location information, and copy level data as part of the library's conversion. The vendor needs this type of information to successfully process the library's MARC records for use in the automated system.

Division for Library Services staff receive many questions on extracting records from WISCAT. Listed below are the more common questions followed by appropriate answers.

1. **What must I do to get my library's MARC records extracted from WISCAT?** Library staff must call the Division for Library Services (608-221-6166) at least two months prior to the scheduled extraction dates. They will be sent a form to complete and return to the division. To assist the library in using its extracted records, division staff must know exactly what the library plans to do with its records and what vendor the library will be working with.
2. **What is the extraction schedule?** The division schedules three extractions per year. Although the dates can vary, the extractions are usually done in April, July, and September. To ensure that all of a library's MARC records will be extracted from WISCAT, library staff must send MITINET data disks to the division by date of the next extraction. Library staff should contact division staff to get the specific dates for the next extractions.
3. **How long before the library receives its MARC records from WISCAT?** It usually takes six to eight weeks for Brodart to update the WISCAT database and then make the corresponding extractions. The schedule can be affected by the number and variety of extractions and other work and changes that may be done to the database. The division will inform libraries of any changes in the extraction schedule.
4. **How much retrospective conversion should be completed before a library requests an extraction?** There is no minimal number of records that must be converted before an extraction is done. However, it is in the library's best interest to have completed all, or almost all, of its conversion. It is not possible to select an extraction of records from WISCAT by a specific date or range of dates. All MARC records for a library are extracted, or none are extracted. Loading records into a local automated system should be done only once. A vendor's ability to add new records or replace data after the initial records are loaded vary considerably. Once library staff begin to edit records in the local automated system, another complete record load will replace all records in the system and thus cause a loss of any editing that was done.
5. **In what format can MARC records be requested?** The cataloging records on WISCAT follow the MARC format as documented in MARC Formats for Bibliographic Data available from the Library of Congress Distribution Service, Washington, D.C. 20541 (202-287-6100). While the records in WISCAT are in the MARC format, there are several different methods used to physically write the data on magnetic tape. Library staff should discuss the options they have with their vendor and division staff before deciding on a specific format. Many vendors can only accept MARC records that

are written on magnetic tape in a specific physical format. If the staff selects the wrong format, the vendor may not be able to use their MARC records.

MARC records can be ordered on tape in the ASCII format or in EBCDIC. The ASCII (American Standard Code for Information Interchange) format is the accepted MARC standard that is also used by vendors of microcomputer-based automated systems. EBCDIC (Extended Binary Coded Decimal Interchange Code) is used primarily on larger automated systems that operate on IBM mainframe computers.

MARC records can also be requested in LC MARC or OCLC MARC formats. The format affects how the data are written on the tape, but does not affect where the data are actually stored in the MARC record. Again, be certain to ask the vendor what format is required.

Brodart does not supply records extracted from WISCAT in the MicroLIF format on floppy disks. If the vendor of the automated system can only accept MicroLIF records on floppy disks, the vendor will have to make this conversion or the library will have to find a third party vendor to convert the MARC records from tape to the MicroLIF format on floppy disks. The division for library services can help with this problem.

6. What information will be on the MARC record the library receives? MARC records extracted from WISCAT include cataloging information and any holdings information entered by the requesting library. Holdings information includes the library's name, call number, location information, and copy level data.

Cataloging information is taken from the master record in the WISCAT database that the library matched during its conversion. The MARC records extracted for the library seldom include cataloging changes or additions such as local subject headings the library may have on its corresponding catalog cards. Library holdings are stored in a special 999 field on the magnetic tape. See the "Description of library holdings in WISCAT" in this appendix for detailed information on the holdings.

7. What does a vendor do with the tapes containing the extracted records? Most mini-computer-based library systems have reel-to-reel tape drives. Libraries with these systems can load MARC records directly from the tapes into their automated systems. Most microcomputer-based library systems do not have reel-to-reel tape drives. Thus, vendors of micro-based systems must transfer the MARC records from a reel of tape to floppy disks or a streaming (cartridge) tape for loading into the microcomputer's hard disk.

Vendors may also need to convert the MARC records to a different record format used to store the cataloging data on the hard disk. Though vendors may support the MARC standard as a source for record input, they often develop their own internal cataloging record format. The vendor's record format may store only selected parts of each MARC record. Library staff must ask the vendor what data will be retained in the local system and what data will be lost.

Before the vendor begins processing a library's records, staff must know what options it has for storing and using data in the automated system. Some vendors require that the library complete a profile form to select the options it wants. Many vendors have a default profile, but this can often be changed if requested. A basic knowledge by the library staff of the MARC format and cataloging practices is helpful in understanding this important process. Vendors must be thoroughly familiar with MARC records to develop data conversion programs to complete the task of moving data from tape to floppy.

The transfer of data is a critical step in the automation process. It is absolutely essential that staff know exactly what the vendor will do with the library's records.

8. Will information in the local automated system look the same as it does in the WISCAT database? Each vendor stores and uses cataloging data differently. Records in the local automated system often do not look like WISCAT records. Different parts of each record may be displayed, and the vendor's system may use smaller versions of records. For example, if a vendor assigns only 50 characters to the title field and a specific title in WISCAT is 80 characters long, the title in the local record will be reduced by 30 characters. It is important to understand that the complete title is in the

MARC record extracted from WISCAT. However, because of limitations in the design of the vendor's record format, only part of the title may be stored for use in the local automated system. Truncating records is very common in micro-based circulation systems.

9. How long will it take the vendor to process a library's records? Processing schedules vary considerably for each vendor. It is not unusual for a library to wait six to ten weeks after the vendor receives the magnetic tapes for its MARC records to be processed. Timeliness can be affected by any special processing that is requested by the library beyond the standard defaults set by the vendor. Library staff should ask their vendor how much time will be needed to process the library's records.

10. What does it cost to have records extracted from WISCAT? The division for Library Services pays a set-up fee to Brodart for each scheduled extraction. Libraries will be charged \$.005 per record extracted and delivered on tape. There is no charge for the reel of tape.

Most vendors also charge for transferring records from tape to floppy disks and for converting the MARC records into their record format for loading into the automated system. Conversion cost varies with each vendor, but most vendors charge between five and 15 cents per record. The cost for this should be determined by the library before the automated system is purchased. Any specialized data processing that the library requests will almost always result in additional charges.

Description of Library Holdings Data in WISCAT

The following section describes how holdings data are recorded in the MARC records extracted from WISCAT. When WISCAT began in 1982, there was no specific MARC format for holdings data. Because of this, each vendor, including Brodart, developed its own holdings data format within the structure of the MARC cataloging record format. There is now a MARC holdings data format, but the holdings in WISCAT still follow Brodart's format as described below.

Library holdings include a two character region code, the library's name, the specific call number assigned to an item, branch locations, and other data. Library holdings are currently stored in the database in one of two methods: 1) OCLC input holdings, or 2) MITINET and separate database input holdings.

Every library holding is in a separate 999 field. Thus, if there are four libraries holding a specific record, there are four 999 fields in that record. A library must document its use of field and subfields prior to having its records processed locally or by a vendor. Each 999 holding field *always* includes the following two subfields:

- \$c 2-4 character alphanumeric library I.D. code for OCLC, GPO, MITINET, and non-MARC holdings. (For MITINET libraries, this number is the four character serial number.)
- \$d 4 character alphanumeric library holding code for OCLC holdings (this is commonly known as the 049 code).
- 4 to 19 character alphanumeric region code and holding library code for MITINET and non-MARC holdings.
- The \$c and \$d subfields are not repeatable within a 999 field.
- Each 999 holding *may* also include the following subfields:

- \$e input stamp entered before the 4 character code (OCLC & GPO holdings) or call number prefix (MITINET holdings)
- \$f call number (all holdings)
- \$g book or cutter number (all holdings)
- \$h branch location (MITINET & non-MARC holdings)
- \$i input stamp entered after the 4 character code (OCLC & GPO holdings)
- \$j copy level data (MITINET holdings)
- \$k copy level data (OCLC holdings)
- \$n notes (OCLC holdings)
- \$m part (OCLC holdings)

- \$l number (OCLC holdings and GPO)
- \$v volume (OCLC holdings)
- \$w local note (OCLC holdings)
- \$z date (OCLC holdings)

- The \$e through \$z subfields may be repeatable within a 999 tag and of variable length.

Other Variations used in MARC Records from WISCAT

Use of the 001 Tag: The 001 tag contains a control number. For OCLC master records it will contain the OCLC number. For records contributed from LC MARC using MITINET/retro, MITINET/marc or a local system, it will contain a Brodart assigned number (BAN number).

Use of the 035 Tag: The 035 tag contains a Brodart assigned number (MITINET number) for master records contributed via OCLC.

Use of the 049 Tag: Records which were created on OCLC and added via OCLC tapes contain an 049 tag. This tag contains the holdings information for the OCLC library that contributed the master record to the database. This information will usually not be used by the extracting library. If holdings were added to an OCLC contributed master record using MITINET, 049 data will not be relevant to the specific library's holdings.

Use of the 852 Tag: Some records in the database contain an 852 tag. This tag is created by the MITINET/marc program and contains holdings information. Because this tag was only recently defined in the MARC format, records added via other methods do not normally have an 852 field. This information will usually not be used by the extracting library.

Use of the 990 Tag: Some records in the database contain a 990 tag. The 990 tag is created by the MITINET/marc program and contains information needed only by the MITINET/marc program. It is not necessary to process the information in the 990 tag.

Use of the 995 Tag: To eliminate duplicate records, Brodart consolidates records by the Library of Congress Card Number. Control numbers from eliminated records are stored in this field. It is not necessary to process the information in the 995 tag.

Brodart use of the 049 and 852 Tags: Brodart transfers the appropriate information in the 049 and 852 tags into the 999 tag as indicated above. However, the original tags and information are left in the master record. These tags should not be used by vendors as valid holdings tags. Instead the holdings information should be read from the 999 tag.

Summary

Libraries extracting records from WISCAT must notify the Division for Library Services several months in advance of the actual need for their MARC records. Libraries must work closely with the division and their vendor throughout the extraction process to make certain it is correctly done with minimum problems and delays.

It is important for library staff to realize that the process of extracting records from WISCAT and using them in a local automated system is a critical part of the automation process. Failure to understand how the vendor will manipulate the MARC data for use in the local automated system can cause problems throughout the life of the system.

If you have any questions about extracting records from WISCAT call the Wisconsin Division for Library Services at (608) 221-6166.

Library Automation and Computer Glossary

The following glossary contains both computer terms and library terms. The terms are defined in the context of library automation and microcomputer-based automated library systems. Terms in the definitions that appear in **bold** are separately defined.

Acceptance test: A test of an automated library system to determine if it meets predetermined guidelines established by the library.

Annual operating costs: The total cost necessary to maintain and operate an automated library system for a period of one year.

ANSI: American National Standards Institute. The major standards body in the United States that coordinates the standards process for a wide variety of applications including information, data exchange, and library applications. (See also **NISO**).

Applications program: Programs written to perform specific functions, for example, word processing, circulation, cataloging, etc. An **automated library system** often contains several application programs (for example, acquisitions, circulation, online catalog).

ASCII: American Standard Code for Information Interchange. ASCII (pronounced "as-key") is a binary code (a series of seven or eight ones and zeros) used to store data and transmit data between computers and computer peripherals. For example, the ASCII character for the uppercase letter "A" is 10000001. This series of ones and zeros is commonly referred to as a **byte**.

Authority control (A/C): In cataloging, the establishment of one accepted "authoritative" form of a name or subject. Without A/C differing forms of a name (e.g. Mark Twain vs. Samuel Clemens) can cause problems in searching an **OPAC** and can confuse patrons. Providing "see" and "see also" references are part of an A/C program. Some automated systems have an **authority control file** to assist staff in maintaining control of names and subjects. Most microcomputer-based programs do not have separate A/C files.

Authority file: A paper or computer **file** containing records that have the accepted forms of names and subjects and any associated cross references.

Automated library system: Programs used to automate major library functions like circulation, cataloging, acquisitions and providing for an online catalog. Most libraries purchase automated library systems from vendors who specialize in creating and marketing these types of computer **application programs**.

Auto-dial: A feature, usually part of a telecommunications program, that can automatically dial a preprogrammed telephone number.

BASIC: BASIC (Beginner's All-purpose Symbolic Instruction Code) is a relatively simple-to-use **programming language** popular with microcomputers.

Backup: 1) A duplicate copy of a computer program or data to be used if the original copy is corrupted, destroyed, or lost. 2) A manual process to be used if an automated system is not functioning.

Barcode: A machine-readable code consisting of bars of varying widths that represent characters. Barcodes are used on all items that circulate and on patron cards in automated circulation systems. The two most popular barcodes for libraries are code 39 and CODABAR.

Batch processing: A method of processing data in which a number of records are grouped or batched, then processed together at the same time. Many early circulation systems were batch systems. Batched processing is the opposite of "real-time" processing where data are processed immediately as a particular transaction takes place. In automated circulation systems the checking out of a title is a real-time process while printing of overdue notices is usually a batch process.

Baud rate: The rate at which signals change from one frequency to another. The term is often used to describe the rate by which data is transmitted over the phone lines using a **modem**.

Bibliographic utility: An organization or corporation that has a large database of cataloged titles that can be used for a variety of purposes including cataloging, **retrospective conversion**, and interlibrary loan. The database is accessible to member libraries via computer **terminals** or through a **dial-up** connection with a microcomputer using a **modem**. **OCLC** (Online Computer Library Center) and **WLN** (Western Library Network) are examples of large bibliographic utilities. They are sometimes referred to as cataloging utilities or cataloging networks.

Bit: A binary digit representing either a zero or one. In most computer systems 8 bits form a **byte** or a character.

Boolean search: A powerful searching method offered in the more sophisticated online catalogs that uses the terms "and," "or," and "and not" to narrow or broaden a search. For example, finding all titles that include the words "whales and dolphins" narrows a search while entering "whales or dolphins" broadens a search. Named after the English mathematician George Boole who first described this form of algebraic expression.

Buffer: A temporary storage area in memory or on a disk for data that are being transmitted between devices with different operating speeds (for example, from the disk drive to the printer) or to store data that may be in high demand.

Bug: A mistake, error, or malfunction in computer **software** or **hardware** that may cause a program to fail (crash) or yield unexpected results.

Bus: A circuit over which data is transferred. Microcomputers use buses to move data (a data bus) or to specify the location of specific data (an address bus). A wider bus (e.g. 32 bits vs. 16 bits) enables more data to be moved or addressed. **ISA**, **EISA**, and **MCA** are examples of popular data buses used in PC compatible microcomputers.

Byte: A series of **bits** that are treated as a single unit or **character** by a computer. Usually a byte consists of eight bits. For example, the byte for the uppercase letter "A" is 10000001 as defined in the **ASCII** character set.

C: A **programming language** that is becoming increasingly popular for many applications including library applications. It is more capable than some other languages at manipulating textual data. Programs written in C can also be more easily run on many different computers without having to be completely rewritten.

Cache: A special high-speed memory (usually fast **RAM**) used to store the most frequently used programs or data. If the data needed is found in cache (a "hit") there is no need to get it from

slower memory or from the disk. Caching, which has been used for many years with **minicomputers**, is becoming more common in the newer, advanced microcomputers.

Catalog conversion: See: **Data conversion**, **Retrospective conversion**.

Catalog maintenance program: The ability of an **automated library system** to allow staff to add, change, and delete cataloging and other data. A comprehensive and easy-to-use maintenance program is essential to maintaining quality control over the cataloging and other data in an automated system.

CD-ROM: Compact Disc-Read Only Memory. A very high density storage medium (552 megabytes) based on CD-audio technology. Many databases previously available only in print form or online are now available on CD-ROM. CD-ROM is also used as a storage medium for library catalogs and as a source of MARC cataloging records for retrospective conversion. A CD is 120 mm or 4.72 inches in diameter.

Character: A letter, digit, punctuation mark, or symbol which may be stored and/or processed by a computer or its peripherals.

Circulation System: An **application program** for checking out and checking in library materials. Most circulation software also manages overdue items, fines, and allows items to be placed on reserve. Because circulation is often a labor intensive process it is usually the first major library function that is automated. Circulation programs are available from vendors of **automated library systems**.

CISC: Complex Instruction Set Computing. Refers to the type of micro-coded instructions used in computer's microprocessor. CISC incorporates many instructions that may not be needed by every **application program**. The microprocessors used in PCs and Apple microcomputers are CISC-based processors. CISC is the opposite of **RISC** (Reduced Instruction Set Computing).

Clock rate: An electronic signal in a microcomputer's **CPU** that controls its operation and allows its basic functions (for example, execution of an instruction) to be performed. The clock rate is expressed in millions of cycles per second (Megahertz, MHz). The first IBM PC had a clock rate of 4.77 MHz; the newer models can operate at 33 MHz or higher. All other factors being equal, a faster clock rate will mean a faster **response time** in an automated system.

Coaxial cable: A cable used for data and/or video transmission. Coaxial cable is commonly used in local area networks (LANs).

COM: Computer Output Microform. Catalog or other information managed by a computer and output to microfilm or fiche. COM catalogs are being increasingly replaced by online catalogs or CD-ROM catalogs.

Command: An instruction, often entered at the keyboard by a user, that tells the software to do some particular task.

Compatibility: 1) The ability of a computer to run software and/or use peripherals designed for another computer. 2) The ability of all components of an automated system (computer, printer, **hard disk drive**, **modem**, **software**, etc.) to work together in a harmonious and mutually supporting fashion.

Computer program: A set of instructions, generally written in a computer language (e.g. **BASIC**, **C**) that a computer follows in processing data or processing a **command** entered by a

user. A computer program written for a specific application (for example, word processing, automating circulation) is often referred to as an **application program**.

CPU: In microcomputers, the CPU (Central Processing Unit) is the microprocessor that performs logical/arithmetic processes and controls basic computer operations. In larger computers CPU functions may be divided between many separate chips. IBM and PC compatibles use a CPU produced by Intel Corp. (the 80386). Apple's Macintosh uses a CPU produced by Motorola Corp. (the 68030).

CRT: A cathode ray tube. A terminal with a vacuum tube used to display information. Often referred to as a **monitor** or VDT (Video Display Terminal).

Cursor: A marker or special character, often a flashing line or rectangle, that indicates position on the screen.

Data conversion: Converting or changing cataloging and patron data from a printed form into an electronic form to be used in an **automated library system**. The process is often called "retrospective conversion." Conversion also refers to changing data already in a computerized form to another computerized form. This is sometimes necessary when changing to a different automated system or significantly upgrading an existing system. Data conversion can be an expensive, labor intensive process.

Data: A general term meaning any information (numbers, letters, words) that is used, processed, or produced by a computer. Cataloging data would refer to all the information found on the typical catalog card.

Database: A collection of records containing related data that can be processed by an application program. For example, a cataloging database would contain records of cataloging data for each title in a library's collection.

DBMS: Database Management System. A program or set of programs used to control, organize, and manage data. Some type of DBMS is used in automated library systems to manage cataloging and other data.

Debug: To eliminate bugs (i.e., mistakes or malfunctions) in **software** or **hardware**.

Dedicated line: A line or circuit assigned exclusively for data communications in an automated system. Lines are usually leased from the telephone company as opposed to a regular telephone line used for **dial access**.

Default: 1) In data entry, information a computer program enters automatically unless the user enters something different. 2) An instruction the computer program executes automatically unless the user selects a different instruction or option.

Device Driver: A small program that allows devices such as CD-ROM drives or other drives to communicate with the computer.

Dial access: The use of a telephone line, modem, and microcomputer to be connected via a phone line to another computer to transmit or receive data. If it is necessary to transmit or receive data on a more continuous or permanent basis then a **dedicated line** is preferred.

DIP switch: Dual In-line Package. Switches used to configure computer devices.

Disk access time: The time needed by a disk drive to locate requested data. Fast access time (sometimes referred to as "seek time") is critical to maintaining quick response time in an automated system. Measured in thousands of a second or milliseconds (ms). Average disk access time of less than 28 ms is preferred in automated systems.

Documentation: The technical information, manuals, user's guides, and accompanying instructions included with **hardware** or **software**. Poor documentation can make it very difficult to properly operate hardware or use a software program.

DOS: Disk Operating System. The programs used by the computer to control the access and transmission of data to and from the disk and the computer. Most disk operating systems also perform other essential "housekeeping" functions not directly related to a computer's **floppy** or **hard disk**. **MS-DOS** is a popular DOS for **PC** and **PC compatible** microcomputers.

Dot matrix printer: A printer that forms characters consisting of close patterns of small dots by means of a print head containing wires that act as individual print hammers.

Download: The transfer of data from one computer system or database to another electronically.

Downtime: The time that a computer or other device is not operational due to a malfunction or other problem. The opposite of **uptime**. Most **automated library systems** have a downtime of less than two percent.

Dumb terminal: A terminal connected to a computer that does not have independent computing capabilities (as does a microcomputer). Dumb terminals are often used in larger **automated library systems** using **minicomputers**.

Dump: To transfer data from one storage medium to another.

EISA: Extended Industry Standard Architecture (pronounced "ee-sa") refers to the width (32 bits) of the data bus in the more advanced models of IBM compatibles microcomputers. The EISA bus is twice the width of the ISA (Industry Standard Architecture) which is also known as the AT bus. EISA allows for the faster transmission of data in the computer. Some IBM microcomputers use IBM's Micro Channel Architecture bus (MCA) which is also 32 bits wide. EISA and Micro Channel are not compatible.

End user: The person(s) or organization who uses an **applications program** or **automated library system**.

Feasibility study: A study undertaken before an automated system is implemented to determine if it is practical, economical, or possible to actually implement an **automated library system** (See also **Long-range automation plan**).

Field: A group of related characters within a **record** treated as a unit. For example in a **MARC record** there are separate fields for author data, title data, subject headings, etc.

File: An organized collection of related data stored and processed as a unit. An automated circulation system may have a file of overdue items.

File server: A powerful microcomputer usually with a large, fast **hard disk** that controls access to data by other microcomputers via a **local area network** (LAN).

Fixed-length: **Records**, **fields**, or subfields that always have the same length. **Automated library systems** that use fixed-length records can cause problems because cataloging data on

lengthy entries exceeds the fixed-length of the record. When this occurs some cataloging data must be excluded from the system. **MARC** cataloging records are **variable-length records** which can accommodate very long or very short cataloging records.

Floppy disk: A flexible magnetic disk used to store data. Floppy disks cannot store as much data as **hard disks**.

Format: 1) The logical arrangement of data inside a **file**. 2) The physical arrangement of data on storage medium such as **hard disk**. 3) The physical arrangement of data on a screen or printed document.

Full-load response time test: A test to determine if an **automated library system** can perform operations and tasks at the rates or levels specified by the library when all **application programs** and **terminals** (microcomputers) are operational.

Function: A group of related routines or operations. In an automated circulation system several distinct but related functions may include charging, discharging, renewals, etc.

Function key: Special keys on a keyboard that when pressed initiate some action from the automated system.

Functional test: A test to determine if an **automated library system** meets all functional features as specified by the library in the library's **Request for Proposal** or Checklist and modified by the vendor's response to the RFP or Checklist.

Garbage: Meaningless characters or information.

Gigabyte (GB): One billion bytes. Often used to express the capacity of disk storage. A large **minicomputer-based automated library system** may have **application programs** and library-related data that occupy more than 2 GB of disk storage.

Glitch: Any unexpected and inexplicable problem in the **hardware** or **software** of an **automated library system**.

Graphics: Nontextual data including charts, maps, photographs, etc. **Automated library systems** that can store and display high **resolution** graphics are becoming more common.

Hang: Any time a computer or terminal does not respond to any keystrokes or other **commands**.

Hard copy: A print copy, usually of data stored in the computer.

Hard disk: A rigid, as opposed to **floppy**, storage disk coated with magnetic material on which data can be recorded in microscopic magnetic domains. Changes in the domains are sensed by a drive read/write head and are translated into the ones and zeros used in the **ASCII** character set. Hard disks provide higher storage capacity and faster access to data than floppy disk drives. Several hard disk drives can be connected to a microcomputer to provide over one **gigabyte** of storage.

Hardware: The physical components of a computer as opposed to the programs (**software**). Hardware includes the computer itself, printers, monitors, disk drives, keyboards, etc.

Index: An ordered list of the contents of a circulation or cataloging database. The **DBMS** creates indexes for patrons, authors, titles, etc. Any words or phrases entered when searching the **online public access catalog** (OPAC) first search the appropriate indexes. Special data in the indexes

locate all the cataloging record(s) on the **hard disk** that match the words searched. Less sophisticated automated systems have limited indexes and thus have limited searching options.

Information: Data that have been combined or arranged to represent or convey meaningful facts, ideas, conditions, or knowledge.

Integrated library system: An **automated library system** containing several **application programs** (for example, acquisitions, circulation, online catalog) that are connected (integrated) so that data can be accessed and exchanged from one application to another. Integrated systems often have less duplication of data because data stored in just one file can be used by several applications.

I/O: The input/output of data to or from the computer. I/O "bottlenecks" often occur in computer systems when there are large volumes of data that cannot be moved or processed fast enough to keep up with the demand from users.

ISA: Industry Standard Architecture, pronounced "eye-sa". Refers to the width (16 bits) of the data bus used in most PC and PC compatibles. Also known as the AT bus. (See also: **EISA** and **MCA**).

Item record: A record containing data for each copy (volume) of a title used in automated circulation systems. Item records contain brief cataloging data and circulation related data including the **barcode** number and loan period. In the more sophisticated **automated library systems**, item records are electronically linked to master cataloging records which contain the complete cataloging information for each unique title in the library's collection.

Keyword: An index that contains all significant words in a cataloging record. Keyword indexing allows searching to be done without regard to the word order of a particular title, author, subject heading, etc. Keyword searching also forms the basis for searching using **Boolean** operators.

Kilobyte (K): One thousand bytes (actually 1,024 bytes). Often used to express the capacity of memory or disk storage. A microcomputer may have 512 K of RAM and a 720 K floppy drive.

LAN: Local Area Network. A network connecting more than one microcomputer. Used in an **automated library system** to link microcomputers used for circulation, staff use, and for the **OPAC**. A LAN is usually located in one building and includes cables, networking cards and networking **software**. Most library automation vendors do not write their own LAN programs but use a LAN available from another vendor.

Light pen: A device resembling a pen which is connected to the computer and is used to optically identify or "read" an item's or patron's **barcode**. Also called a "bar wand." (See also **Optical scanner**).

Log-on: A procedure or command initially entered at the keyboard that enables a person to access or use an automated system.

Long-range automation plan: A comprehensive master plan for implementing or upgrading an automated system in the library. The plan usually incorporates the findings of a **feasibility study** and/or a **needs assessment**. The long-range plan describes how automation can improve services and it establishes a priority on what tasks are to be automated, when they are to be automated, how much automation will cost, and the impact of automation on patrons, staffing, and work flow. Most plans project at least five years into the future.

Machine-readable: Information in a form that can be read, sensed, or recognized by a computer or other electromechanical device.

Magnetic disk: See **Hard disk**.

Magnetic tape: A tape stored on reels or in cartridges that is coated with magnetic material (for example, iron oxide) on which data can be recorded in microscopic magnetic domains. Changes in the domains are sensed by the tape drive read/write head and are translated into the ones and zeros used in the **ASCII** character set. A cartridge tape drive is often used in micro-based **automated library systems** to back-up data from the **hard disk**.

MARC records: Machine Readable Catalog records. Cataloging records that conform to the national standard (**ANSI Z39.2**) for communicating and storing cataloging data in a computerized format. The MARC format is used by the Library of Congress and in most large **automated library systems** and **bibliographic utilities**. Some micro-based **automated library systems** use non-MARC records which can cause problems in trying to upgrade the system or to change systems.

MCA: Micro Channel Architecture. Refers to the 32 bit width of the data bus used in more advanced models of IBM PS/2 microcomputers. More data can be moved across a wider bus than a narrower bus. Standard PCs use a 16 bit data bus known as the **ISA**. (See also: **EISA**).

Megabyte (MB): One million bytes. Often used to express the capacity of memory or disk storage. A microcomputer may come with 2 MB of RAM and an 80 MB disk drive.

Menu-driven: A program that lists options (a "menu") on the screen that can be selected by the user. A user selects one of the options rather than typing a specific **command** at the keyboard.

MicroLIF: MicroLIF (Microcomputer Library Interchange Format) is an alternative to the **MARC** format. Developed for storing cataloging data on floppy disks to make it easier to load cataloging records into micro-based automated systems. MicroLIF is scheduled to be replaced by true **MARC records** in late 1991.

Millisecond (ms): One thousandth of a second. Often used to measure the speed of access time to data.

Minicomputers: Minicomputers were designed in the 1960s to run more than one program at a time (**multitasking**) and to be used by more than one person (**multiuser**). Most vendors of larger **automated library systems** use minicomputers which are more powerful than microcomputers on a **hard disk**.

Mode: An operating condition or method.

Modem: Modulator-Demodulator. A device that changes the digital signals of a computer to analog signals to enable two or more computers to communicate with each other over conventional telephone lines.

Monitor: A video display unit or **CRT**.

MS-DOS: Microsoft-Disk Operating System. Developed by Microsoft Corp. it is the most popular **DOS** used on PCs. A variation called **PC-DOS** is used on real IBM microcomputers.

Multitasking: A computer or automated system capable of performing two or more tasks simultaneously. Most microcomputers do not support true multitasking but instead switch back and forth at very high speeds from one task to another.

Multiuser: A computer or automated system that allows more than one user to use the system at the same time.

Nanosecond: (ns). One billionth of a second. Often used to measure the speed of some computer operations, especially the time to access **RAM**.

Needs assessment: A study which closely scrutinizes the methods used to complete various library tasks, (for example, processing overdue notices, filing cards in the catalog, etc.) and outlines the problems and costs inherent in completing these tasks. The results of a needs assessment are often incorporated into a comprehensive **long-range automation plan**.

Network: A generic term that applies to a any variety of electronic communications systems that facilitate the exchange of programs and data from one computer to another and with computer users. A local area network (**LAN**) is often used to connect microcomputers together to share data in an **automated library system**.

Network drop: An access point on a network that allows a microcomputer or other device (for example, a printer) to be attached to the network.

NISO: National Information Standards Organization. An **ANSI** accredited organization responsible for coordinating standards relating to information services, publishing, and libraries.

NREN: National Research and Education Network. A proposed high-speed telecommunications network designed to operate at much higher speeds (three billion bits/second) than current networks.

OCLC: Online Computer Library Network. A large international **cataloging utility** or cataloging **network** based in Ohio. The OCLC database includes over 20 million titles and is used by many larger libraries for cataloging, as a source of **MARC** records and for interlibrary loan.

OCR: Optical Character Recognition. The ability of a computer to recognize characters or symbols (for example, **barcodes**). OCR is a form of data entry using an **optical scanner** or **light pen** instead of typing data at the keyboard.

Offline: Equipment or a process not under direct control of the central processing unit of a computer or a process that is done in a **batched processing** mode such as the printing of overdue notices.

Online: Equipment or a process under the direct control of the computer. Wandering in a **barcode** for an item being circulated or entering a search on an **OPAC** are "online" activities. Online is usually synonymous with "**real-time processing**."

Online Catalog: See: **OPAC**.

OPAC: Online Public (or Patron) Access Catalog. A computerized catalog that replaces the traditional card catalog. OPACs allow patrons to search for items in the library's collection by entering a search (for example, an author's name) at the keyboard. OPACs allow more search options than are available in card catalogs. Implementing an OPAC entails changes in technical

services operations and is an obvious change for patrons. Ease of use, a very important factor when judging any OPAC, differs dramatically from one vendor's OPAC to another's.

Optical scanner: A device that can sense or read information (text, pictures, **barcodes**, etc.) via reflected light and convert it into **machine-readable** data that can be processed by a computer. (See also **OCR**).

OSI: Open Systems Interconnection. A set of seven "layers" that when fully implemented will facilitate the transfer of data between different (incompatible) computer systems, including different **automated library systems**.

Output: Transfer of data from a computer to a **peripheral device** (e.g. **monitor** or **printer**).

Parallel communications: A method where data is sent one byte (generally eight bits) at a time.

Password: A secret code or word usually entered at the keyboard that allows the user access to a file, program, information service, bulletin board, etc. Passwords must often be used to initially log onto an automated system.

PC: Personal Computer. Commonly refers to the various models of IBM microcomputers and IBM compatible microcomputers.

Peripheral devices: Devices such as **printers**, **monitors**, and **modems** that are connected to the computer but are not considered an integral part of the actual computer.

Port: An input/output (I/O) channel through which a **peripheral device** can communicate with a computer.

Program: A sequence of instructions that cause a computer to perform a specific task. Programming is the art of designing, writing, and testing such instructions.

Programming language: The special language in which computer programs are written. There are scores of different computer languages from the popular such as BASIC to the obscure such as spitalball.

Protocol: A set of rules that govern and coordinate the communication between computers. The **OSI** is a set of communications protocols.

RAM: Random Access Memory. A computer's internal memory chips used to store data that can be read or written. RAM is volatile and any data in RAM are erased when the power to the computer is turned off or fails. RAM is measured in kilo or megabytes (for example, 640K, 2MB).

Real-time processing: The immediate processing of a transaction by the computer. Wandering in a **barcode** for an item being circulated or entering a search on an **OPAC** involve "real-time" processing tasks. Real-time processing is often synonymous with "**online processing**." It is the opposite of "**batch processing**" which is often synonymous with "**off-line**" processing.

Record: A collection of related items or data elements (for example, **fields** and **subfields**) treated as a unit. A **MARC** record contains all the pertinent cataloging data for a particular title.

Reliability test: A test of the **hardware** and/or **software** to determine if an **automated library system** can operate at a defined level of effectiveness for a stated period of time.

Request for Information (RFI): A brief document sent by a library to vendors requesting information on the general functions and costs of the vendors' automated library systems. The RFI outlines the library's basic automation needs and also includes statistical data (number of titles, circulations, terminals needed, etc.) RFIs are sent when a library may not necessarily have the funds for a system but wants to ascertain general costs for budget preparation. Costs that vendors provide are not binding. Most RFIs are three to seven pages in length.

Request for Proposal (RFP): A document listing specific features needed from an automated library system. The RFP asks vendors to respond to the library's needs as stated in the RFP including a description of the **software, hardware**, and costs. An RFP is a much more detailed document than an **RFI** and often more than 50 pages in length. RFPs are not usually issued until the library has a firm commitment in funding. Costs provided are usually binding for 60 or 90 days.

Request for Quotation (RFQ): A document used to solicit price quotations or bids from vendors for an automated library system. An RFQ may also include specific features, and it is sometimes often interchangeably with RFP.

Resolution: The quality, in regard to clarity, sharpness, and density, of a **monitor's** display. The higher resolution, the better the quality.

Response time: The elapsed time between entry of a command or a search request to an automated system and the return of a response or the results of a search. Response time is an important measurement of an **automated library system's** performance. The need to process too much data or having to support too many users on an automated system can slow response time to unacceptable levels.

Retrospective conversion: The process of changing information from a printed form into a computerized format. Often refers to changing cataloging information from the 3 by 5 catalog cards into the **MARC** format or another format. (See also: **Data conversion**).

RISC: Reduced Instruction Set Computing. Refers to the micro-coded instructions used by some computers and "high-end" workstations. RISC minimizes the number and complexity of the operations used by the microprocessor. They can thus complete basic computer instructions and process data more efficiently. Some vendors of **minicomputers**-based library systems now offer RISC-based machines that are less expensive than traditional minicomputers. Most microcomputers including the PC and Apple microcomputers use **CISC** (Complex Instruction Set Computing).

ROM: Read Only Memory. The part of a computer's internal memory used to store data that are permanently programmed and may be read but not changed. ROM is not volatile. That is, the data are maintained even when the power is off.

Save: To store data, for example a cataloging record or the results of a search, in the computers memory or to a disk.

Shared automated system: An automated library system that is shared by libraries often in different physical locations. Most shared systems operate on super microcomputers or minicomputers. Libraries can share programs and library data (for example, circulation data and catalog data) usually using some form of telecommunications (phone lines) to connect terminals from one library to another. A shared system can be contrasted to a **stand-alone automated system**.

Site visit: A visit by library staff to another library with an automated system for purposes of examining and studying the system.

Software: In contrast to **hardware**, the set of computer programs and related documentation for a computer system or for a specific application such as a circulation system.

Sort: To rearrange the records in a file according to a specific, logical order, for example, alphabetically.

Spike: A brief but sharp increase in the electrical power.

Stand-alone automated system: An automated system that serves only one library. Stand-alone systems are the opposite of **shared automated systems**. Most microcomputer-based automated systems are stand-alone systems.

Subfield: A group of related characters within a **field**. For example in the title **field** of a **MARC record** there are separate subfields for the main title, subtitle, and statement of responsibility.

System requirement: A specification of what a system must do or how it must be designed to satisfy the needs of the library.

Systems analysis: The thorough examination and analysis of all aspects of a job or task (for example, circulation) to determine the most effective and efficient method of accomplishing what must be done.

Tag: One or more characters that identify or specify a data element or **field** of a **record**.

TCP/IP: Transmission Control Protocol/Internet Protocol. A set of telecommunications protocols commonly used in many national and international telecommunication networks. The TCP/IP may eventually be replaced by the **OSI** protocols.

Terminal: A **peripheral device** that includes a keyboard and video display monitor that is connected to a computer. "Dumb" terminals that are often used in larger automated systems do not have separate computing capabilities as do microcomputers.

Truncate: 1) To cut off data in a **field** because its length exceeds the prescribed field length. Many non-MARC **records** have truncated fields for cataloging data. 2) In searching, to enter only part of a word or phrase to broaden the search results.

Turnkey library system: An **automated library system** which includes all hardware and software supplied by one vendor that has been designed so that the library can start the system by merely (euphemistically) "turning the key."

Unix: An operating system originally developed in the 1970s by AT&T. Unix has become increasingly popular because it is structured in a fashion that makes it easier to operate on a wide range of computers. **Application programs**, including programs for **automated library systems**, that are written to operate under Unix are more easily transportable to other computers. Unix is most often used in **minicomputers** and **RISC**-based computers. (Many microcomputer-based **automated library systems** still use **MS-DOS** or the operating system used by the local area network (**LAN**)).

Uptime: The time that an automated system is operational. Most systems have an uptime of at least 98 percent. (See also **Downtime**.)

User friendly: A phrase used to describe how easy an automated system is to use and/or operate. Because of its overuse the phrase has become almost meaningless.

Utility program: A special general-purpose computer program, that performs common or oft-repeated tasks such as copying data from one disk to another or printing data.

Variable field: A field which varies in length according to its contents. Most fields in a **MARC record** are variable length. For example, if a title has twenty characters the title field will be twenty characters long. If a title has 200 characters, the title field will be 200 characters in length.

Variable record: A record which varies in length according to its contents. **MARC records** are variable length records. Some micro-based **automated library systems** work with fixed length records.

Wildcard: In searching an **OPAC**, entering a **character** (usually an asterisk or a question mark) that tells the computer to "accept anything in this position." For example the entry of "wom?n" when searching a title will find all titles that have the word "women" and "woman" in them.

WISCAT: The Wisconsin Union Catalog. WISCAT lists 3.7 million titles from over 780 Wisconsin libraries. It is primarily used for interlibrary loan, catalog **data conversion**, and as a source of **MARC records** for local **automated library systems**. WISCAT is on microfiche and **CD-ROM**.

Work station: 1) A table or desk, chair, and microcomputer or **CRT** terminal and other equipment used by library staff in performing various tasks in an **automated library system**. 2) A powerful desktop computer, often using **RISC** technology, that is often used for high **resolution** design work, computer-aided design (CAD), and engineering.